RINGSPANN®
Power Transmission

Shaft-Hub-Connections

Shrink Discs • Cone Clamping Elements • Star Discs
Clamping Systems for torque motors • Star Spring Washers

Edition 2016/2017

Table of Contents

RINGSPANN®

Issue 06/2016 • Technical details subject to change without notice.

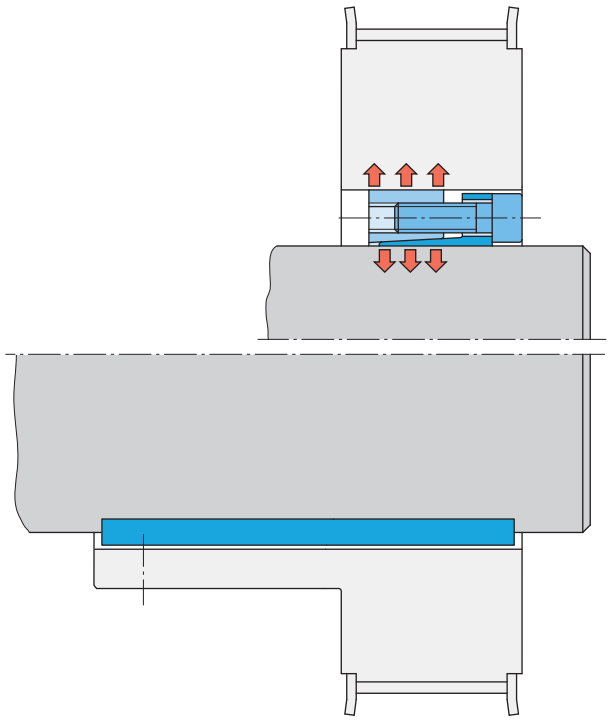
Why frictional shaft-hub-connections

Frictional shaft-hub-connections are standard machine elements used to connect shafts and hubs. They are capable of transmitting torque, axial forces, radial forces and bending moments.

Shrink Discs and Cone Clamping Elements

Among the frictional shaft-hub-connections Shrink Discs and Cone Clamping Elements take an important position. By tightening clamping screws conical surfaces are pulled together generating radial forces; these forces provide the required frictional connection between the parts involved in the transmission of torques or forces.

Shrink Discs and Cone Clamping Elements are capable of transmitting much higher torques than conventional positive connections with keyways. The shafts can be designed smaller and shorter. The relationships between shaft diameter and shaft length are illustrated in the example shown in figure 3-1. In this comparison, the same torque is transmitted via a Cone Clamping Element (upper half of the figure) and via a keyway connection (lower half of the figure). The Cone Clamping Element design offers a much more compact and cost effective solution.



Upper half of figure: Shaft-hub-connection with Cone Clamping Element
Lower half of figure: Shaft-hub-connection with keyway 3-1

Star Discs

A special category of frictional shaft-hub-connection is the RINGSPANN Star Disc. Connections using Star Discs are ideally suite to applications requiring repeated adjustment with adjustment devices in a short overall length.

Clamping Systems for torque motors

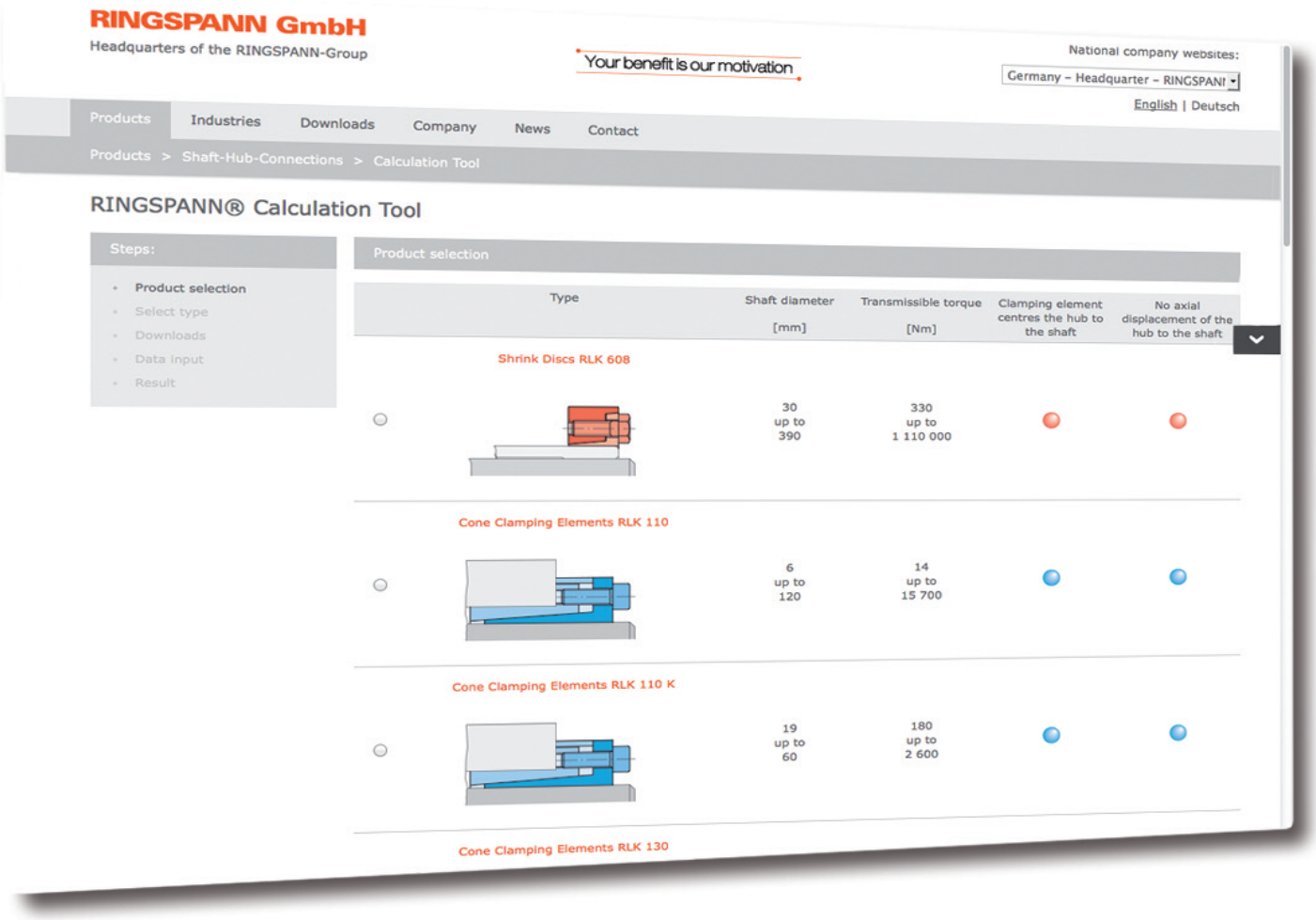
Both complete torque motors and integrated torque motors can be connected by friction to machine shafts with RINGSPANN torque motor clamping systems. In addition to secure, backlash free torque transmission, these systems also ensure precise centring of the torque motor on the machine shaft.

Star Spring Washers as Ball Bearing Compensating Discs

RINGSPANN Star Spring Washers are particularly light spring elements with linear or non linear spring characteristic. They are suitable for application as pressure elements in precision machines and as pressure springs for taking up free movement, and for reducing noise in ball bearings.

Advantages of Frictional shaft-hub-connections

- **Backlash free connections**
- **No notch effect in contrast to keyway connections**
- **Ideal for reversing operation**
- **Simultaneous transmission of torque and axial force**
- **Easy alignment of hub to shaft**
- **Compact solutions due to high power density**
- **Reduced costs due to simple shaft and hub geometry**
- **Connections can be released even after long operation time**



The new RINGSPANN Calculation Tool has been developed to work out the right and time-efficient dimensioning of an optimal shaft-hub-connection.

Whether a Cone Clamping Element or a Shrink Disc, reliable results concerning the necessary hub dimensions and bearing pressures can be determined within a few minutes, as well as the transmissible torques and axial forces for different strengths, torques and numbers of screws. This means that any oversizing or undersizing of the elements can be avoided and a cost-optimised solution found for the application in question.

The use of the tools is intuitively designed and the calculation results are available after just a few steps. A suitable product is first selected based on certain criteria, such as for example the dimensions or the torque to be transmitted. The information related to the selected product is then offered for download as a pdf file as well as the appropriate CAD models.

After that, a customised calculation is carried out and the result is represented in a clear layout. Now the torques and axial forces can even be calculated while torque and axial force are transmitted at the same time.

A special function offered by the Calculation Tool is that it checks the torque to be transmitted while taking the axial forces that occur into account, as well as any additional bending moments such as those which can occur in the pulleys of belt conveyor systems.

The Calculation Tool is thus a functional tool for reliably checking a RINGSPANN shaft-hub-connection for your application.

You will find an easy-to-follow video tutorial on our website at:
ringspann.com/en/downloads/videos

Online Calculation Tool shaft-hub-connections

RINGSPANN®

Shrink Discs

Cone Clamping Elements

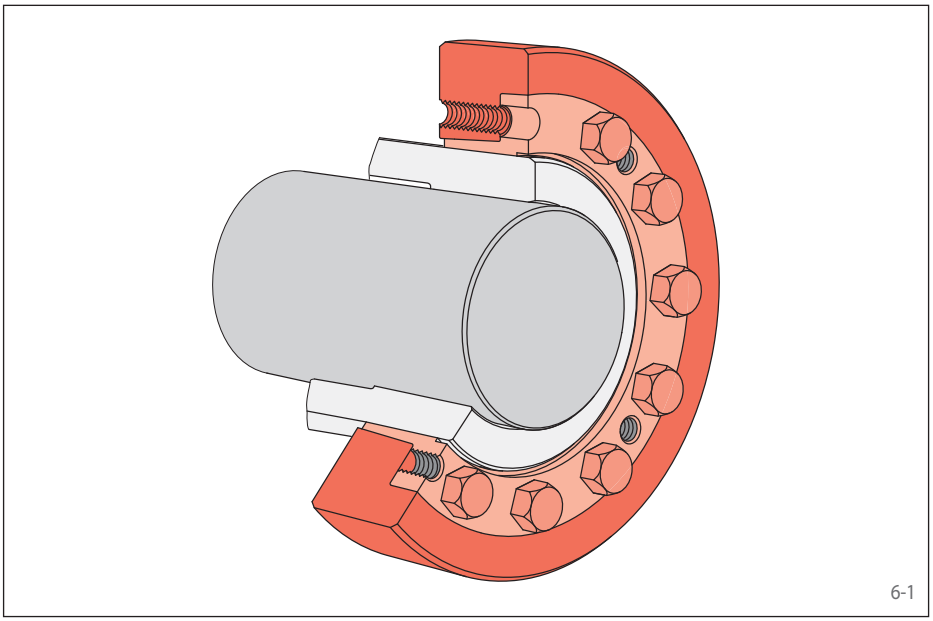
Overview of the functions of the Calculation Tool:

- Selection of series and clamping set sizes
- Downloading of relevant product information
- Downloading of CAD models
- Calculation of transmissible torque and axial forces for customized shaft diameters while taking tightening torques, the number of clamping screws, yield strengths, materials and tolerances into account
- Calculation of the transmissible torques and axial forces while at the same time transmitting torque and axial force
- Calculation of transmissible torques with bending moments occuring simultaneously
- Calculation of the required outside diameter of the hub
- Calculation the necessary hub width

Shrink Discs

Shrink Discs are external clamping connections for the backlash free fastening of hollow shafts or hubs to shafts. By tightening clamping screws conical surfaces are pulled together generating radial forces; these forces press the hollow shaft onto the shaft. Torques or axial forces can be transmitted frictionally from the hollow shaft to the shaft. The Shrink Disc itself is not involved in the transmission of torques or axial forces. The radial clamping forces which act through the circumference of the hollow shaft also ensure an optimum centring to the shaft.

Shrink Discs are used, for example, to fasten machine shafts to gearboxes with hollow-shafts.

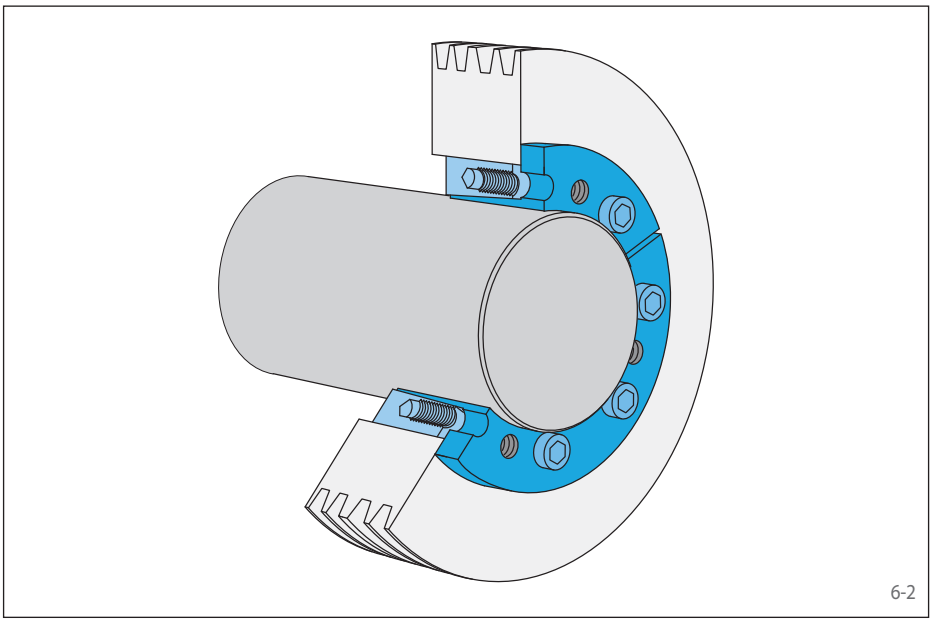


6-1

Cone Clamping Elements

Cone Clamping Elements are internal clamping connections for backlash free fastening of hubs on shafts. By tightening clamping screws conical surfaces are pulled together generating radial forces; these forces create a frictional connection between the Cone Clamping Element and the shaft as well as the hub. Torques or axial forces can be transmitted from the shaft via the Cone Clamping Element to the hub.

Cone Clamping Elements are used, for example to fasten sprockets, flywheels, levers, pulleys, brake discs or conveyor-belt drums.

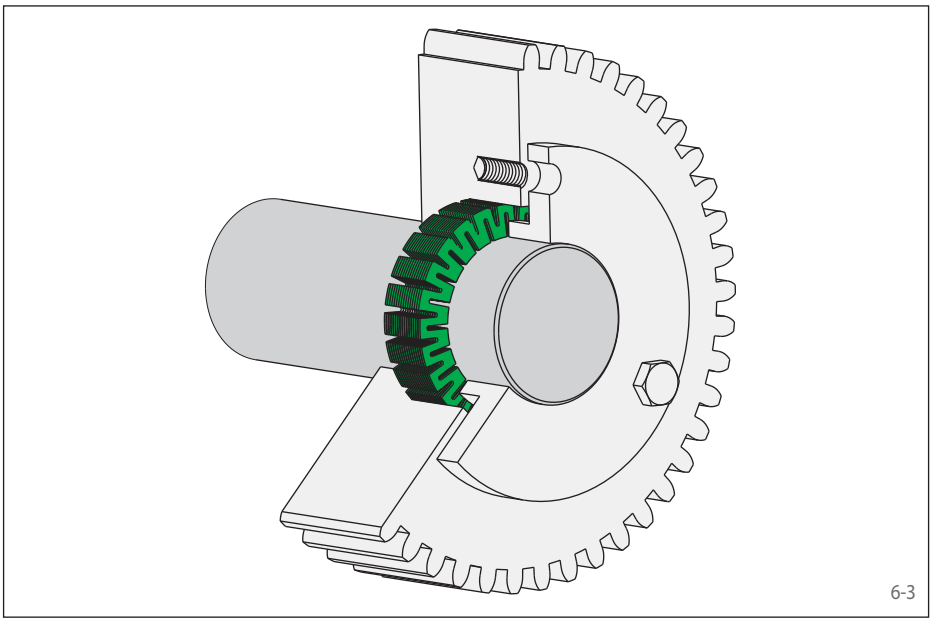


6-2

Star Discs

Star Discs are flat-bevelled rings which are slotted on the outside and inside. An external axial actuating force is translated by the Star Disc into a much higher radial force. This force creates a frictional connection between the Star Disc and the shaft as well as the hub. Generally, Star Discs are installed in a multiple arrangement as a disc pack. This makes it possible to adjust the transmissible torque to the requirements of the specific application.

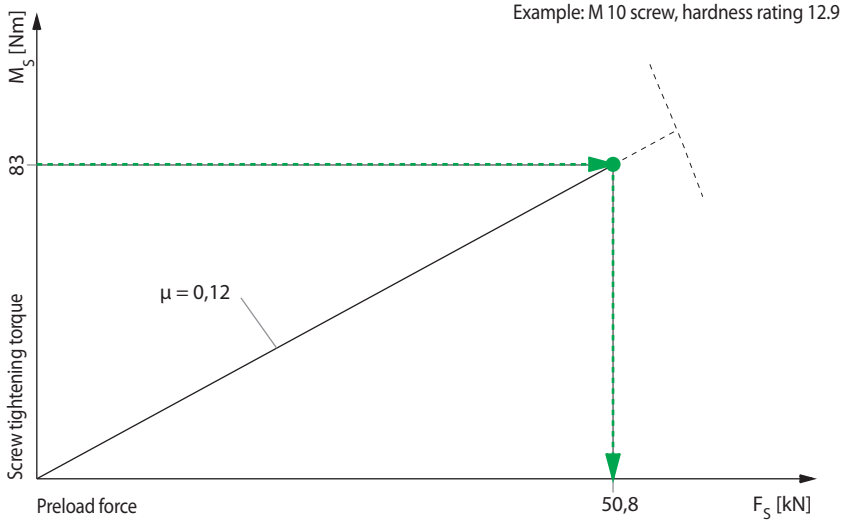
Shaft-hub-connections with Star Discs are used wherever frequent clamping and release are required, for example in adjustment devices.



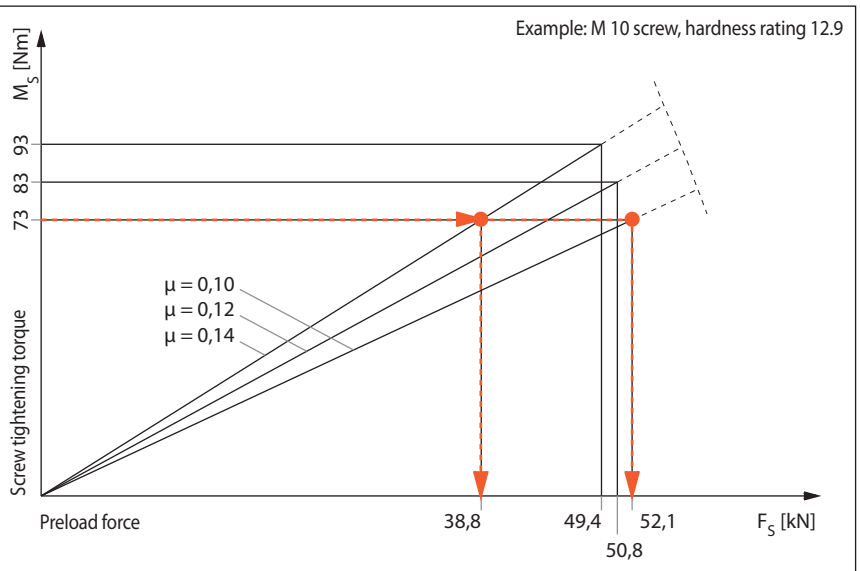
6-3

The RINGSPANN calculation method takes into account the friction-coefficient fluctuations which naturally occur in all screw connections. The transmissible torques or axial forces listed in this catalogue are based on friction-coefficient fluctuations in accordance with VDI Guideline 2230 and are minimum values. This ensures a reliable selection of the shaft-hub-connection.

In contrast, torques shown in catalogues issued by various other manufacturers are based on simplified calculation methods. These catalogue values are often comparatively higher, but are subject to the friction-coefficient fluctuations described below and thus do not represent reliable minimum values for customers and users.



Simplified calculation method without accounting for friction-coefficient fluctuations 7-1



RINGSPANN calculation method accounting for friction-coefficient fluctuations 7-2

In most frictional shaft-hub-connections, the frictional connection is created by torque-controlled tightening of screws. These axially positioned screws are tightened to a specified screw tightening torque. On the basis of the determined preload forces and the transmission ratio of the conical angles, the radial forces between the clamping element and the shaft or hub are calculated by taking into account friction losses. With these radial forces and the friction coefficients between the components, the transmissible torques or axial forces can be calculated.

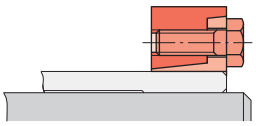
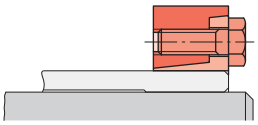
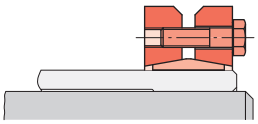
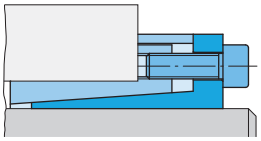
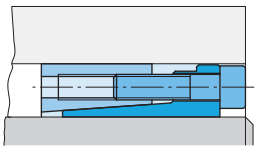
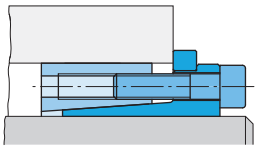
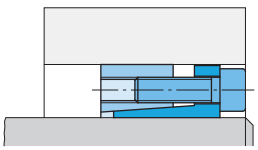
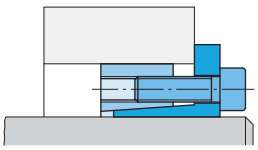
The determination of the correct actual preload force in a given application is of prime importance. Simple calculation methods are based on an assumed preload force, from which the pressures (and thus the component stress factors) as well as the transmissible torques or axial forces are calculated. The use of such calculation methods is dangerous, as friction-coefficient fluctuations lead to actual preload forces that are higher or lower than assumed. If the actual preload forces are higher, also higher torques may be transmitted, but then the component stress factors are also higher than calculated, which can cause component damage (e.g. to the hub) in extreme cases. In the opposite case, when the preload forces are lower than assumed, the calculated torques or axial forces may not be transmitted. Consequently, the connection slips.

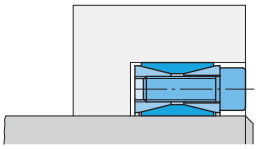
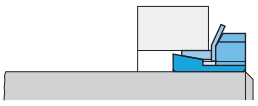
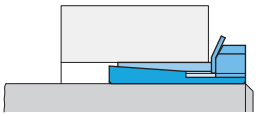
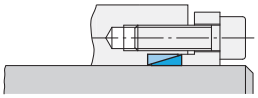
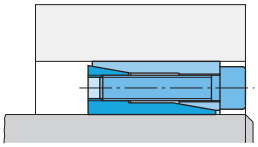
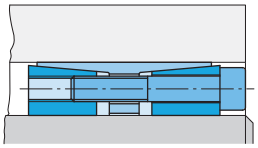
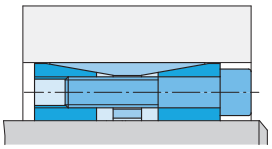
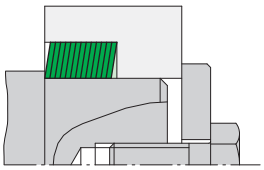
The RINGSPANN calculation method ensures that such errors in the dimensioning of shaft-hub-connections are avoided. This is achieved by using a method that has been tested and proven over many years, according to which the real friction coefficient μ_K in the contact area under the head of the screw and μ_G in the screw threading lie between 0,10 and 0,14. This conforms to current engineering standards as described in VDI Guidelines 2230. The RINGSPANN method for calculating preload forces is described below using the example of a M 10 screw with a hardness rating of 12.9.

As the actual friction coefficient in a given case is unknown, the screw tightening torque M_S must correspond to the lowest friction coefficient of $\mu = 0,10$ ($M_S = 73$ Nm) according to the RINGSPANN calculation method. If a higher tightening torque is used, the screw could be overloaded.

If the actual friction coefficient is $\mu = 0,14$, then the preload force $F_S = 52,1$ kN will not be achieved with a screw tightening torque of $M_S = 73$ Nm. The preload force will be only $F_S = 38,8$ kN, as shown in figure 7-2. The transmissible torque is then calculated on the basis of a preload force of $F_S = 38,8$ kN, whereas the component stress factors in the hub are calculated on the basis of a preload force of $F_S = 52,1$ kN.

Overview RINGSPANN shaft-hub-connections

	Type	Shaft diameter [mm]	Transmissible torque at a reference shaft of 50 mm [Nm]	Radial height		Axial width			Clamping element centres the hub to the shaft	No axial displacement of the hub to the shaft during clamping	Actuating device integrated (screws)	Page
				flat	standard	short	medium	long				
Shrink Discs	**RLK 608** 	30 up to 620	2600		●		●		●	●	●	**12**
Shrink Discs	**RLK 606** 	24 up to 155	1950		●		●		●	●	●	**16**
Shrink Discs	**RLK 603** 	14 up to 500	2200		●		●		●	●	●	**20**
Cone Clamping Elements	**RLK 110** 	6 up to 120	2350	●				●	●	●	●	**32**
Cone Clamping Elements	**RLK 130** 	20 up to 180	3000		●		●		●		●	**36**
Cone Clamping Elements	**RLK 131** 	20 up to 180	1850		●		●		●	●	●	**38**
Cone Clamping Elements	**RLK 132** 	20 up to 200	2600		●	●			●		●	**40**
Cone Clamping Elements	**RLK 133** 	20 up to 200	1850		●	●			●	●	●	**42**

	Type	Shaft diameter mm	Transmissible torque at a reference shaft of 50 mm [Nm]	Radial height		Axial width			Clamping element centres the hub to the shaft	No axial displacement of the hub to the shaft during clamping	Actuating device integrated (screws)	Page
				flat	standard	short	medium	long				
Cone Clamping Elements	**RLK 200** 	20 up to 400	1 850		●	●				●	●	**44**
	RLK 250 	15 up to 70	560	●		●			●		●	**46**
	RLK 250 L 	15 up to 60	930	●				●	●		●	**48**
	RLK 300 	10 up to 200	423	●		●						**50**
	RLK 350 	5 up to 50	1 900		●		●		●		●	**54**
	RLK 402 	25 up to 300	3 500		●			●	●	●	●	**56**
	RLK 404 	70 up to 600	7 000*		●			●	●	●	●	**58**
Star Discs		5 up to 100	1 200**		●	●						**68**

* At a reference shaft diameter 70 mm • ** For a pack of 16 Star Discs

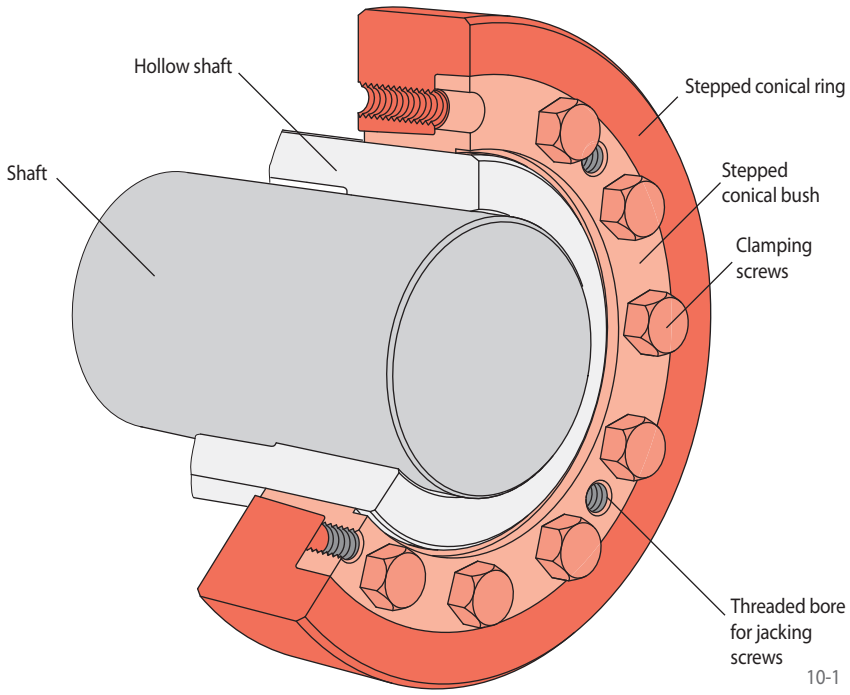
Two-part Shrink Discs

Design and Function

Two-part shrink discs consist of an outer stepped conical ring, and an inner stepped conical bush, as well as a number of clamping screws (see Figure 10-1).

The stepped conical ring is pulled onto the stepped conical bush by tightening the clamping screws. A radial clamping force is generated by the conical sufaces, which is independent of the friction coefficients at the screws and conical surfaces. The radial clamping force presses the hollow shaft onto the shaft and creates a frictional connection at the contact surfaces between the shaft and the hollow shaft. Thereby, torque and/or axial force can be transmitted between the shaft and the hollow shaft.

During the clamping process, the position of the stepped conical bush relative to the hollow shaft remains unchanged. The connection is released by tightening clamping screws in the threaded bores for the jacking screws.



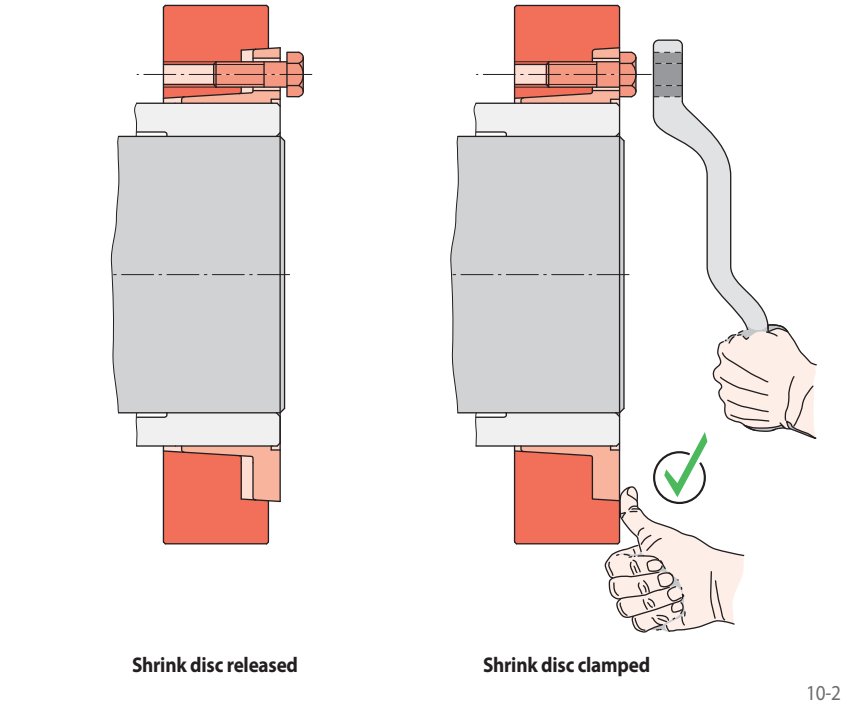
10-1

Distance-controlled assembly

The clamping screws are tightened uniformly in a clockwise sequence until the front face of the stepped conical ring is flush with the front face of the stepped conical bush (see figure 10-2).

Once this assembly state is reached, the torque or axial force values shown in the tables can be reliably transmitted between the hollow shaft and the shaft.

Insufficient or missing lubrication of the conical surfaces as might happen during servicing will make the assembly procedure impossible to complete.

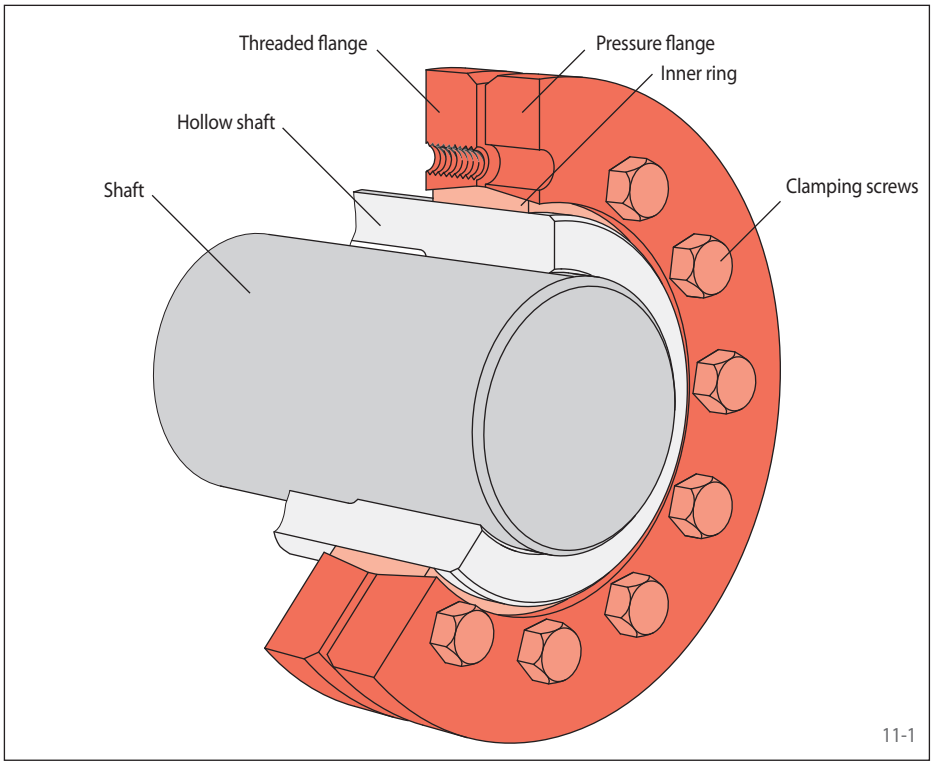


10-2

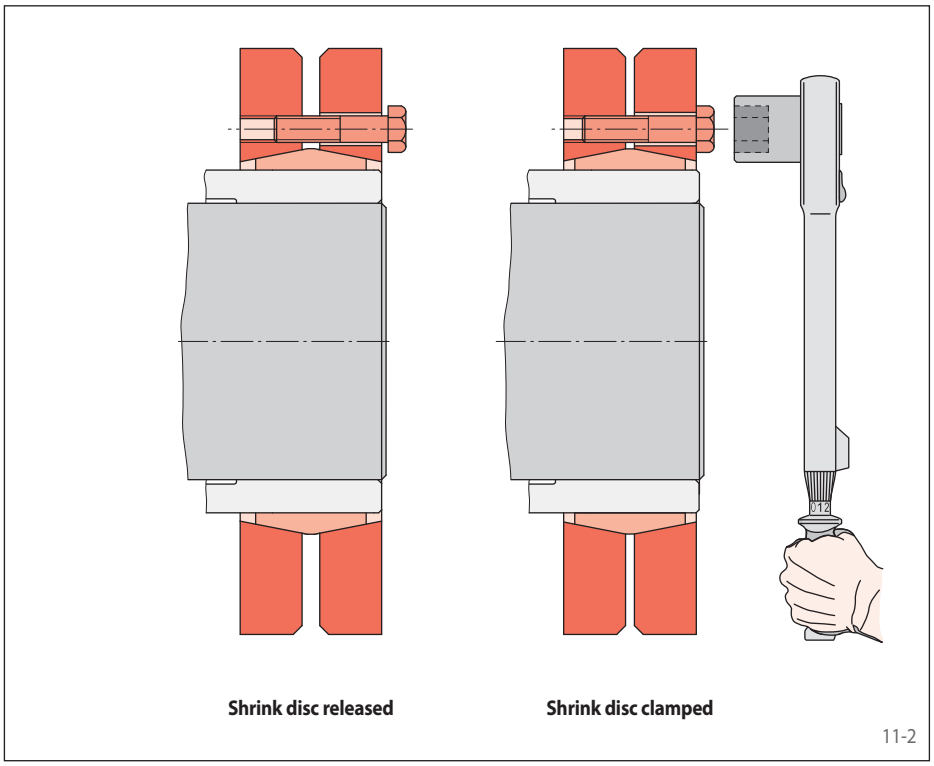
Characteristics

- **Easy, quick assembly by tightening clamping screws without a torque wrench**
- **Modern design with high power density**
- **Distance-controlled assembly ensures guaranteed transmissible torques**
- **Enclosed design, therefore impervious to dirt**
- **True running even at high speeds**

Three-part Shrink Discs



11-1



11-2

Characteristics

- **Tightening of clamping screws with a torque wrench**
- **Classical design**
- **Torque-controlled assembly**
- **Easy disassembly without jacking screws**

Design and Function

Three-part shrink discs consist of a threaded flange, a pressure flange, a slotted inner ring and a number of clamping screws (see figure 11-1).

The threaded flange and the pressure flange are pulled together over the inner ring by tightening the clamping screws. A radial clamping force is generated by the conical surfaces which is dependent on the friction coefficients at the screws and conical surfaces. The radial clamping force presses the hollow shaft onto the shaft and creates a frictional connection at the contact surfaces between the shaft and the hollow shaft. Thereby, torque and/or axial force can be transmitted between the shaft and the hollow shaft.

During the clamping process, the position of the inner ring relative to the hollow shaft remains unchanged. The connection is released simply by loosening the clamping screws, as the cone angles are self-releasing.

Torque-controlled assembly

The clamping screws are thightened uniformly in a clockwise sequence until the specified torque is achieved (see figure 11-2).

Insufficient or missing lubrication of the conical surfaces as might happen during servicing, results in a reduction of the radial clamping force. The torques or axial forces listed in the tables can no longer be transmitted reliably. This often goes unnoticed as the specified tightening torque was achieved during assembly and the assembly procedure is considered completed.

Shrink Discs RLK 608

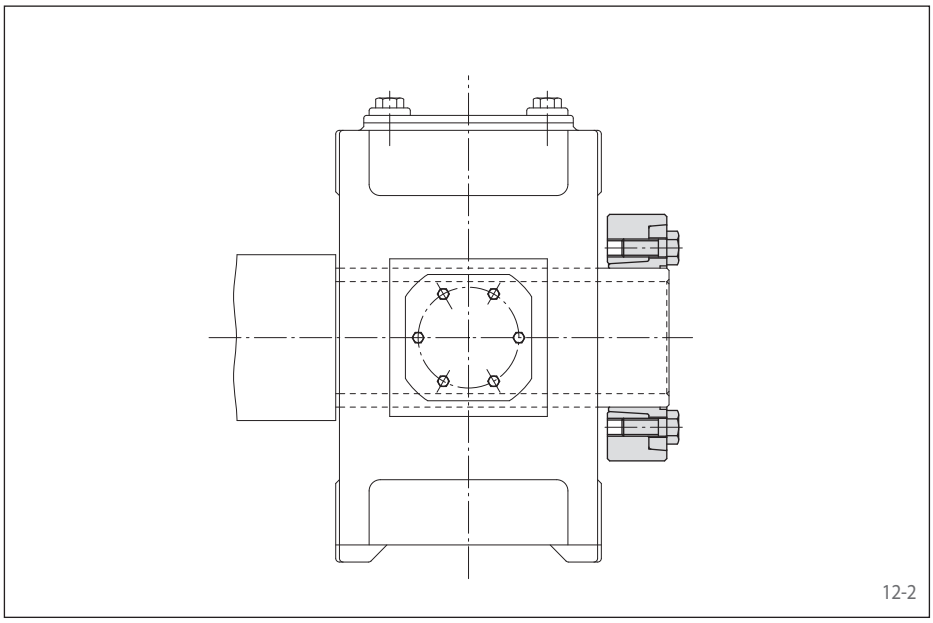
RINGSPANN®

two-part design
highest transmissible torques


12-1

Features

- Highest transmissible torques
- Easy, quick assembly by tightening clamping screws without a torque wrench
- Distance-controlled assembly ensures guaranteed transmissible torques
- Enclosed design, therefore impervious to dirt
- True running even at high speeds
- Centres the hollow shaft or hub to the shaft
- For hollow shafts or hubs with outer diameters of 30 mm up to 620 mm


12-2

Application example

Backlash free connection of a hollow-shaft gearbox to a machine shaft with a Shrink Disc RLK 608. The backlash free connection reduces the risk of fretting corrosion. As a result, the connection can be easily disassembled even after long periods of operation.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 13 through 15 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

d_w > mm	d_w ≤ mm	Hollow shaft bore ISO	Shaft ISO	Joint clearance min. mm	Joint clearance max. mm
24	30	H7	h6	0	0,034
30	50			0	0,041
50	80			0	0,049
80	120			0	0,057
120	160			0	0,065
160	180	H7	g6	0,014	0,079
180	250			0,015	0,090
250	315			0,017	0,101
315	390			0,018	0,111

Other fits may be selected, provided the joint clearance between the shaft and the hollow shaft remains within the indicated ranges.

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hollow shaft:

- Yield strength $R_e \geq 360$ N/mm^2
- E-module ca. 206 kN/mm^2

Installation

Please request our installation and operating instructions for Shrink Discs RLK 608.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 28 and 29.

Example for ordering

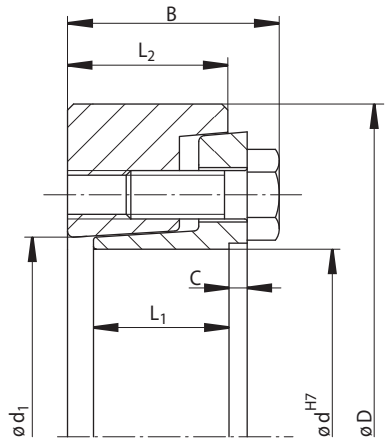
Shrink Disc RLK 608 for hollow shaft with an outer diameter d = 155 mm:

- RLK 608-155
  Article number 4200-155801-000000

Shrink Discs RLK 608

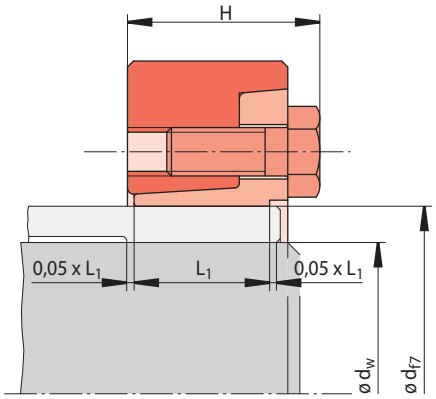
RINGSPANN®

two-part design
highest transmissible torques



Shrink Disc released

13-1



Shrink Disc clamped

13-2

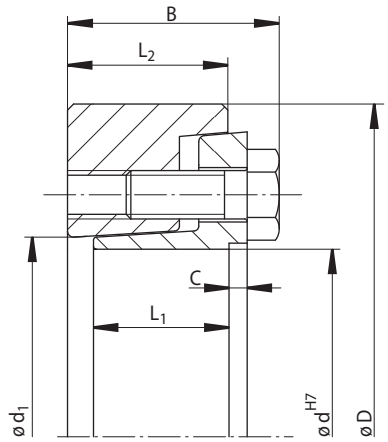
Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
30	60	32	25	16,5	19	2	23,0	24 25 26	330 370 415	27 29 31	6	M 6	16	0,3	4200-030801-000000
36	72	38	28	18	20,5	2	25,8	27 30 33	660 850 1070	48 56 64	5	M 8	20	0,5	4200-036801-000000
44	80	47	30	20	22,5	2	27,8	34 35 37	950 1030 1200	55 58 64	6	M 8	20	0,6	4200-044801-000000
50	90	53	33	22	24,5	2	29,8	38 40 42	1750 2000 2250	92 100 105	8	M 8	20	0,8	4200-050801-000000
55	100	58	35	23	26,5	3	31,8	42 45 48	2050 2400 2800	97 100 110	8	M 8	20	1,1	4200-055801-000000
62	110	66	35	23	26,5	3	31,8	48 50 52	2900 3200 3550	120 120 130	9	M 8	20	1,3	4200-062801-000000
68	115	72	35	23	26,5	3	31,8	50 55 60	3000 3800 4650	120 130 150	9	M 8	20	1,4	4200-068801-000000
75	138	79	40	25	29	3	35,4	55 60 65	4900 6100 7400	170 200 220	10	M 10	25	2,4	4200-075801-000000
80	141	84	40	25	29	3	35,4	60 65 70	5200 6400 7700	170 190 220	10	M 10	25	2,4	4200-080801-000000
90	155	94	46	30	35	4	41,4	65 70 75	6900 8200 9700	210 230 250	10	M 10	30	3,4	4200-090801-000000
100	170	104	51	34	40	5	46,4	70 75 80	8800 10350 12000	250 270 300	12	M 10	30	4,6	4200-100801-000000
105	185	114	59	39	46	6	53,5	80 85 90	15500 17800 20000	380 410 440	12	M 12	35	6,6	4200-105801-000000
110	185	114	59	39	46	6	53,5	80 85 90	15500 17800 20000	380 410 440	12	M 12	35	6,2	4200-110801-000000
120	200	124	63	42	49	6	56,5	85 90 95	17200 19700 22300	400 430 460	12	M 12	35	7,7	4200-120801-000000
125	215	132	63	42	49	6	56,5	90 95 100	19150 21700 24400	420 450 480	12	M 12	35	9,2	4200-125801-000000
130	230	139	68	46	53	6	60,5	95 100 110	25900 29000 36000	540 580 650	14	M 12	35	11,7	4200-130801-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Shrink Discs RLK 608

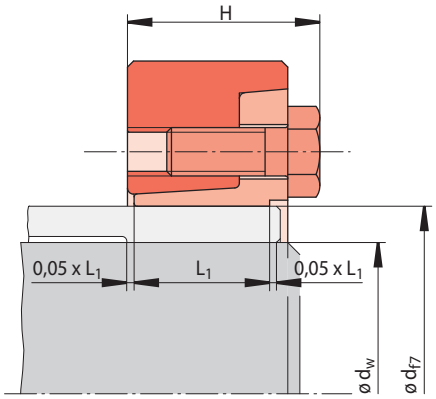
RINGSPANN®

two-part design
highest transmissible torques



Shrink Disc released

14-1



Shrink Disc clamped

14-2

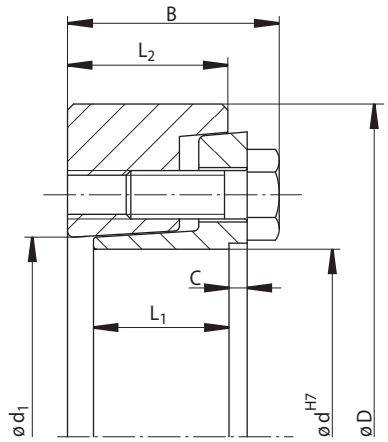
Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d	D	d_1	B	L_1	L_2	C	H	d_w*	M	F	Number	Size	Length		
mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN			mm	kg	
140	230	144	71	46	53	6	61,8	100 105 115	27000 30200 37000	540 570 640	12	M 14	40	10,8	4200-140801-000000
150	263	159	75	50	57	6	65,8	110 115 125	35700 39500 47500	640 680 760	12	M 14	40	16,3	4200-150801-000000
155	263	159	75	50	57	6	65,8	110 115 125	36200 40000 48000	650 690 760	12	M 14	40	15,8	4200-155801-000000
160	290	169	82	56	63	6	73,0	120 125 135	56000 61000 72500	930 970 1000	12	M 16	50	22,6	4200-160801-000000
165	290	169	82	56	63	6	73,0	120 125 135	56500 61500 72500	940 980 1000	12	M 16	50	22,0	4200-165801-000000
170	300	179	82	56	63	6	73,0	130 135 145	61000 66500 78000	930 980 1000	12	M 16	50	23,6	4200-170801-000000
175	300	179	82	56	63	6	73,0	130 135 140	61500 67000 72500	940 990 1000	12	M 16	50	22,9	4200-175801-000000
180	320	191	99	72	79	6	89,0	140 145 155	97500 105000 122000	1300 1400 1500	16	M 16	50	33,9	4200-180801-000000
185	320	191	99	72	79	6	89,0	140 145 155	96000 104000 120000	1300 1400 1500	16	M 16	50	33,0	4200-185801-000000
190	320	195	100	71	79	7	89,0	150 155 165	92000 99000 113500	1200 1200 1300	16	M 16	50	33,0	4200-190801-000001
195	340	206	100	71	79	7	89,0	150 155 165	107000 115000 129000	1400 1400 1500	16	M 16	50	37,6	4200-195801-000000
200	340	206	100	71	79	7	89,0	150 155 165	108000 116000 130000	1400 1400 1500	16	M 16	50	36,6	4200-200801-000000
220	370	228	121	87	95	7	107,5	160 170 180	160000 182000 206000	2000 2100 2200	16	M 20	60	51,6	4200-220801-000000
240	405	248	127	92	100	7	112,5	170 180 200	190000 215000 269000	2200 2300 2600	18	M 20	60	65,3	4200-240801-000000
260	430	268	137	102	110	7	122,5	190 200 220	247000 277000 340000	2600 2700 3000	21	M 20	60	79,1	4200-260801-000000
280	460	288	150	115	123	7	135,5	210 220 240	335000 370000 449000	3100 3300 3700	22	M 20	60	100,0	4200-280801-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Shrink Discs RLK 608

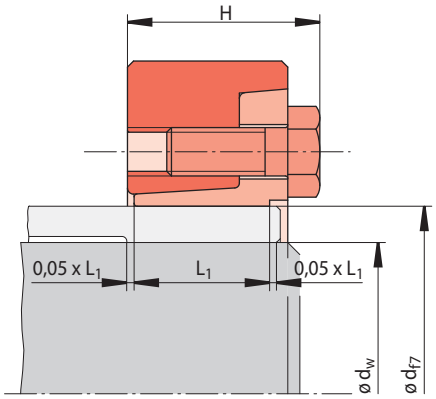
RINGSPANN®

two-part design
highest transmissible torques



Shrink Disc released

15-1



Shrink Disc clamped

15-2

Dimensions									Technical Data					Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
300	485	308	162	122	131	8	146	220 230 250	386 000 425 000 508 000	3 500 3 600 4 000	20	M 24	80	116,3	4200-300801-000000
320	520	328	158	116	125	8	140	240 250 270	465 500 509 000 600 000	3 800 4 000 4 000	18	M 24	80	129,0	4200-320801-000000
340	570	348	170	127	136	8	151	250 260 280	564 000 612 000 719 000	4 500 4 700 5 100	20	M 24	80	175,0	4200-340801-000000
360	590	369	177	133	142	8	157	270 280 300	658 000 712 000 825 000	4 800 5 000 5 500	20	M 24	80	197,0	4200-360801-000000
390	650	399	195	144	153	8	172	290 300 320	903 000 970 000 1 110 000	6 200 6 400 6 900	18	M 30	100	254,0	4200-390801-000000
420	670	428	203	162	167	4	189	320 330 350	1 084 000 1 158 000 1 313 000	6 700 7 000 7 500	20	M 27	80	285,0	4200-420801-000001
440	725	448	222	173	180	6	202	340 350 370	1 353 000 1 440 000 1 621 000	7 900 8 200 8 700	21	M27	80	371,0	4200-440801-000001
460	760	468	225	173	180	6	202	360 370 390	1 509 000 1 600 000 1 790 000	8 300 8 600 9 100	21	M 27	80	409,0	4200-460801-000001
480	790	488	249	198	202	3	226	380 390 410	1 860 000 1 966 000 2 186 000	9 700 10 000 10 600	21	M 30	100	495,0	4200-480801-000000
500	835	508	244	195	199	3	223	400 410 430	2 098 000 2 210 000 2 445 000	10 400 10 700 11 300	24	M 30	100	554,0	4200-500801-000000
530	870	538	266,3	213	216	3	240	430 440 460	2 645 000 2 777 000 3 050 000	12 300 12 500 13 000	24	M 30	100	638,0	4200-530801-000000
560	920	568	268,5	217	221	3	245	450 460 480	2 778 000 2 912 000 3 190 000	12 000 12 500 13 000	24	M 30	100	730,0	4200-560801-000000
590	960	598	284	232	237	4	261	470 480 500	3 238 000 3 386 000 3 693 000	13 500 14 000 14 500	28	M 30	100	842,0	4200-590801-000000
620	970	630	310	254	259	4	283	500 520 540	3 585 000 3 898 000 4 225 000	14 000 14 500 15 500	28	M 30	100	892,0	4200-620801-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Shrink Discs RLK 606

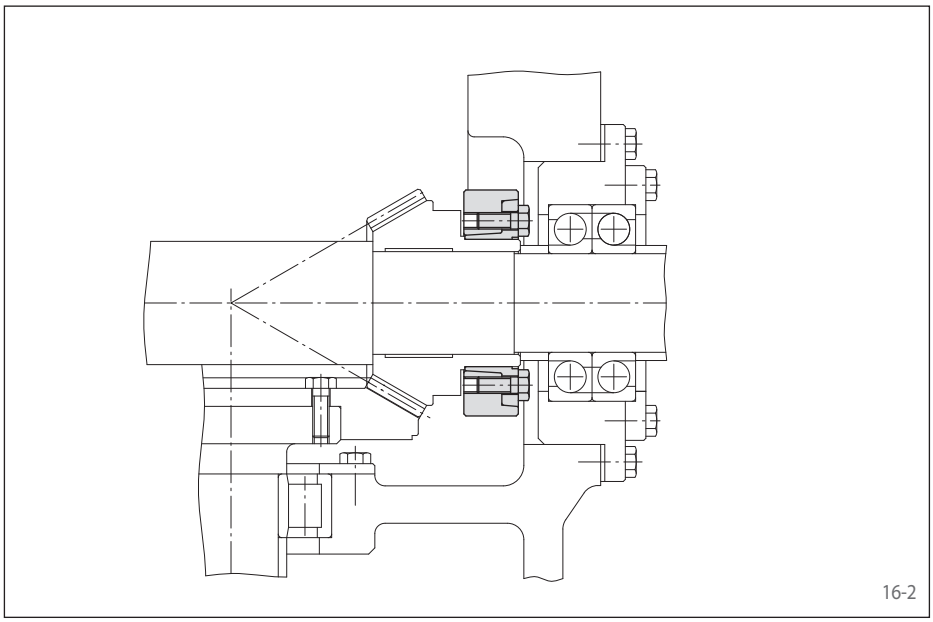
RINGSPANN®

two-part design
high transmissible torques


16-1

Features

- High transmissible torques
- Easy, quick assembly by tightening clamping screws without a torque wrench
- Distance-controlled assembly ensures guaranteed transmissible torques
- Enclosed design, therefore impervious to dirt
- True running even at high speeds
- Centres the hollow shaft or hub to the shaft
- For hollow shafts or hubs with outer diameters of 24 mm up to 155 mm


16-2

Application example

Backlash free connection of a bevel spur gear to a drive shaft of a gearbox with a Shrink Disc RLK 606. The backlash free connection permits extended reversing operations.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 17 through 18 are subject to the following tolerances, surface characteristics and material requirement. Please contact us in the case of deviations.

Tolerances

d_w > [mm]	d_w ≤ [mm]	Hollow shaft bore ISO	Shaft ISO	Joint clearance min. [mm]	Joint clearance max. [mm]
24	30	H7	h6	0	0,034
30	50			0	0,041
50	80			0	0,049
80	120			0	0,057
120	155			0	0,065

Other fits may be selected, provided the joint clearance between the shaft and the hollow shaft remains within the indicated ranges.

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hollow shaft:

- Yield strength $R_e \geq 340$ N/mm^2
- E-module ca. 206 kN/mm^2

Installation

Please request our installation and operating instructions for Shrink Discs RLK 606.

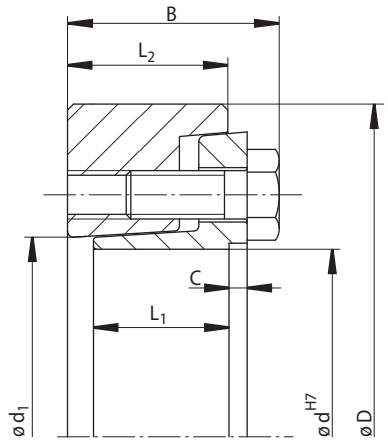
Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 28 and 29.

Example for ordering

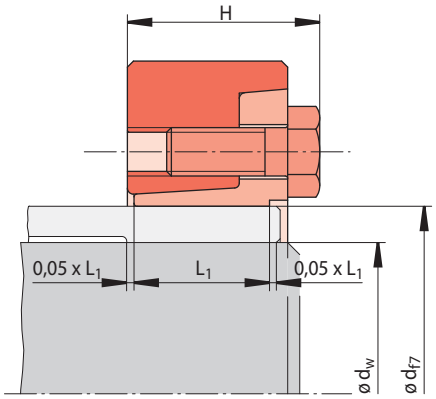
Shrink Disc RLK 606 for hollow shaft with an outer diameter d = 100 mm:

- RLK 606-100
  Article number 4200-100601-000000



Shrink Disc released

17-1



Shrink Disc clamped

17-2

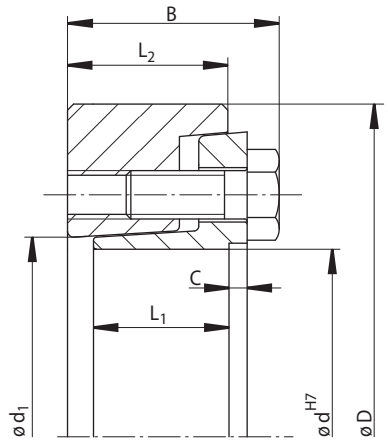
Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
24	50	26	22	15	17	1	21,0	19 20 21	165 210 240	17 21 22	5	M 6	16	0,3	4200-024601-000000
30	60	32	24	17	19	1	23,0	24 25 26	280 330 370	23 26 28	6	M 6	16	0,3	4200-030601-000000
36	72	39	27,5	19	20,5	1	25,8	27 30 33	480 630 820	35 42 49	5	M 8	20	0,5	4200-036601-000000
40	80	47	29,5	20,5	22,5	1,5	27,8	30 32 34	480 580 700	32 36 41	6	M 8	20	0,6	4200-040601-000000
44	80	47	29,5	20,5	22,5	1,5	27,8	34 35 37	720 780 920	42 44 49	6	M 8	20	0,6	4200-044601-000000
50	90	53	31	22	24	1,5	29,3	38 40 42	1150 1300 1520	60 65 72	8	M 8	20	0,8	4200-050601-000000
55	100	58	34,5	24,5	27	1,5	32,3	42 45 48	1300 1600 1900	61 71 79	8	M 8	20	1,2	4200-055601-000000
62	110	66	34,5	24,5	27	1,5	32,3	48 50 52	1700 1950 2160	70 78 83	9	M 8	20	1,5	4200-062601-000000
68	115	72	35	24,5	27	1,5	32,3	50 55 60	1900 2500 3150	76 90 105	9	M 8	20	1,6	4200-068601-000000
75	138	79	38	25	28	2	34,4	55 60 65	2700 3400 4100	98 113 126	10	M 10	25	2,6	4200-075601-000000
80	141	84	38	25	28	2	34,4	60 65 70	3300 4100 4950	110 126 141	10	M 10	25	2,8	4200-080601-000000
90	155	94	45	31,5	35	2,5	41,4	65 70 75	5500 6600 7900	169 188 210	11	M 10	25	3,4	4200-090601-000000
100	170	104	50,5	36,5	40	2,5	46,4	70 75 80	6200 7400 8600	177 197 215	14	M 10	30	4,6	4200-100601-000000
110	185	114	57	40,5	45,5	3	53,0	80 85 90	10500 11800 13700	262 277 304	12	M 12	35	6,2	4200-110601-000000
120	197	124	61	45	49	3	56,5	85 90 95	12500 14100 16000	294 313 336	14	M 12	35	7,4	4200-120601-000000
125	215	134	61,5	45	49	3	56,5	90 95 100	14500 16600 18800	322 349 376	14	M 12	35	9,3	4200-125601-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Shrink Discs RLK 606

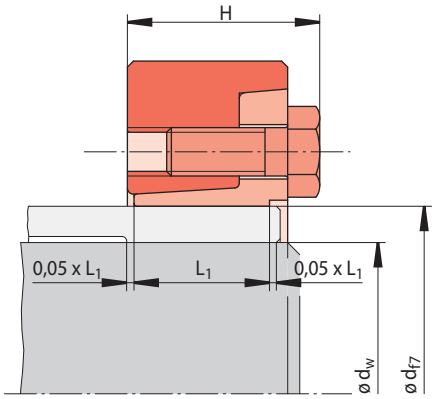
RINGSPANN®

two-part design
high transmissible torques



Shrink Disc released

18-1



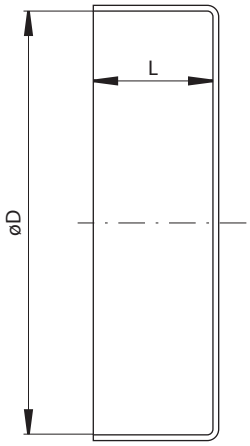
Shrink Disc clamped

18-2

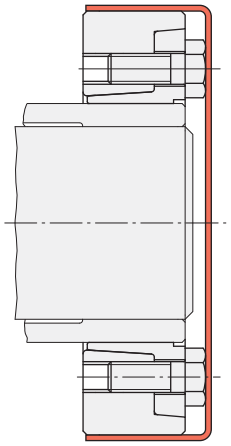
Dimensions									Technical Data						Article number
									Transmissible torque or axial force		Clamping screws			Weight	
Size d mm	D mm	d_1 mm	B mm	L_1 mm	L_2 mm	C mm	H mm	d_w* mm	M Nm	F kN	Number	Size	Length mm	kg	
130	215	134	61,5	45	49	3	56,5	95 100 110	17000 18400 22000	357 368 400	14	M 12	35	8,7	4200-130601-000000
130	230	139	66,5	47	53	4	61,8	95 100 110	18400 20800 26200	387 416 476	12	M 14	40	11,9	4200-130601-000001
140	230	144	67	47	53	4	61,8	100 105 115	19900 22200 27800	398 422 483	12	M 14	40	11,0	4200-140601-000000
150	263	159	72	51	57	4	65,8	110 120 125	27000 32000 36200	490 533 579	14	M 14	40	16,0	4200-150601-000000
155	263	159	72	51	57	4	65,8	110 120 125	27000 32000 36200	490 533 579	14	M 14	40	16,0	4200-155601-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

19-1



19-2



19-3

Characteristics

The cost-effective covers made from black plastic (PVC) provide simple contact protection for Shrink Discs RLK 608 and RLK 606 against the screw heads of the rotating Shrink Disc.

Example for ordering

Cover for Shrink Disc RLK 608-100:

- Cover size 100:
  Article number 5025-168901-000000

Size	Covers for shrink discs		Dimensions		Weight	Article number
			D	L		
	RLK 608	RLK 606	mm	mm	kg	
36	RLK 608-36	RLK 606-36	72	27	0,02	5025-070901-000000
44	RLK 608-44	RLK 606-44	80	29	0,04	5025-078901-000000
50	RLK 608-50	RLK 606-50	90	31	0,10	5025-087901-000000
62	RLK 608-62	RLK 606-62	110	33	0,08	5025-108901-000000
68	RLK 608-68	RLK 606-68	115	33	0,08	5025-113901-000000
75	RLK 608-75	RLK 606-75	138	36	0,10	5025-136901-000000
80	RLK 608-80	RLK 606-80	141	36	0,15	5025-139901-000000
100	RLK 608-100	RLK 606-100	170	48	0,15	5025-168901-000000
120	RLK 608-120	RLK 606-120	197	60	0,20	5025-195901-000000
125	RLK 608-125	RLK 606-125	215	58	0,25	5025-210901-000000
140	RLK 608-140	RLK 606-140	230	65	0,40	5025-228901-000000
155	RLK 608-155	RLK 606-155	263	67	0,45	5025-261901-000000
190	RLK 608-190	RLK 606-190	320	90	0,84	5025-320901-000000

Shrink Discs RLK 603

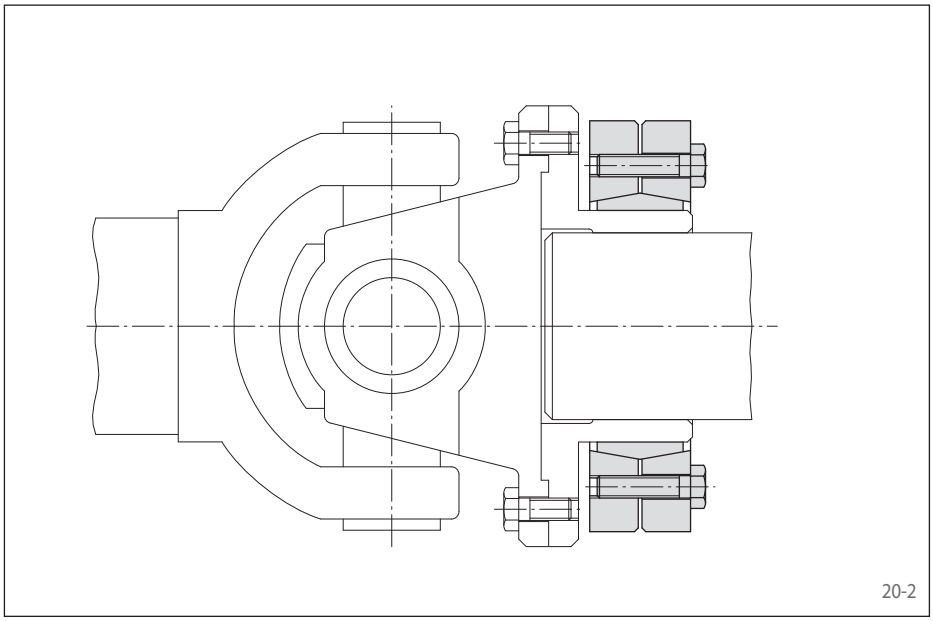
three-part design
high transmissible torques

RINGSPANN®


20-1

Features

- High transmissible torques
- Tightening of clamping screws with a torque wrench
- Easy disassembly without jacking screws
- Centres the hollow shaft or hub to the shaft
- For hollow shafts or hubs with outer diameters of 14 mm up to 500 mm


20-2

Application example

Backlash free connection of a cardan shaft flange to a machine shaft with a Shrink Disc RLK 603. The backlash free connection reduces the risk of fretting corrosion. As a result, the connection can be easily disassembled even after long periods of operation.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 21 through 23 are subject to the following tolerances, surface characteristics and material requirement. Please contact us in the case of deviations.

Tolerances

d_w > mm	d_w ≤ mm	Hollow shaft bore ISO	Shaft ISO	Joint clearance min. mm	Joint clearance max. mm
6	10	H6	j6	-0,007	0,011
10	18			-0,008	0,014
18	30			-0,009	0,017
30	50	H6	h6	0	0,032
50	80	H6	g6	0,029	0,048
80	120	H7	g6	0,012	0,069
120	180			0,014	0,079
180	250			0,015	0,090
250	315			0,017	0,101
315	360			0,018	0,111

Other fits may be selected, provided the joint clearance between the shaft and the hollow shaft remains within the indicated ranges.

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hollow shaft:

- Yield strength $R_e \geq 340$ N/mm^2
- E-module ca. 206 kN/mm^2

Installation

Please request our installation and operating instructions for Shrink Discs RLK 603.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 28 and 29.

Example for ordering

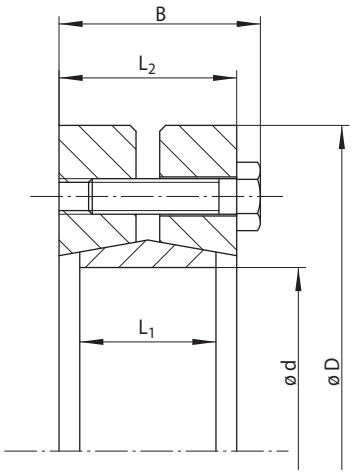
Shrink Disc RLK 603 for hollow shaft with an outer diameter d = 100 mm:

- RLK 603-100
  Article number 4200-100301-000000

Shrink Discs RLK 603

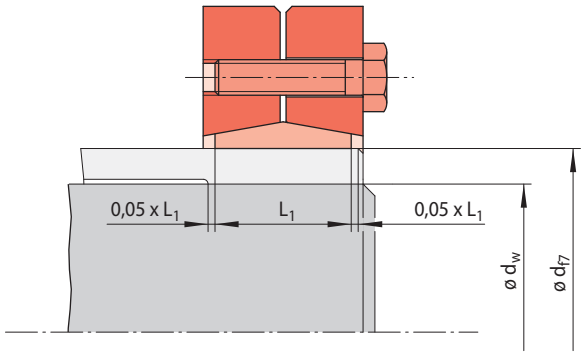
RINGSPANN®

three-part design
high transmissible torques



Shrink Disc released

21-1



Shrink Disc clamped

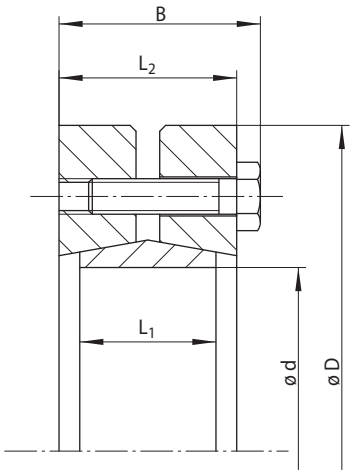
21-2

Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Clamping screws				Weight	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
14	38	15	9	11	10 11 12	25 35 50	5 6 8	4	4	M 5	10	0,1	4200-014301-000000
16	41	19	11	15	12 13 14	50 70 90	8 10 12	4	5	M 5	14	0,1	4200-016301-000000
20	50	23	14	19	15 16 18	130 150 200	17 18 22	4	6	M 5	18	0,2	4200-020301-000000
24	50	23	14	19	19 20 21	180 210 250	18 21 23	4	6	M 5	18	0,2	4200-024301-000000
30	60	25	16	21	24 25 26	310 340 380	25 27 29	6	6	M 5	18	0,3	4200-030301-000000
36	72	27	18	23	28 30 31	460 590 630	32 39 40	12	5	M 6	20	0,5	4200-036301-000000
44	80	29	20	25	32 35 36	630 780 860	39 44 47	12	7	M 6	22	0,6	4200-044301-A01000
50	90	31	22	27	38 40 42	940 1 100 1 300	49 55 61	12	8	M 6	22	0,8	4200-050301-A01001
55	100	34	23	30	42 45 48	1 200 1 500 1 900	57 66 79	12	8	M 6	25	1,1	4200-055301-000000
62	110	34	23	30	48 50 52	1 800 2 200 2 400	75 88 92	12	10	M 6	25	1,3	4200-062301-000000
68	115	34	23	30	50 55 60	2 000 2 500 3 100	80 90 100	12	10	M 6	25	1,4	4200-068301-000000
75	138	37	25	32	55 60 65	2 500 3 200 3 900	90 100 120	30	7	M 8	30	2,3	4200-075301-000000
80	145	37	25	32	60 65 70	3 200 3 900 4 600	100 120 130	30	7	M 8	30	2,5	4200-080301-000000
90	155	44	30	39	65 70 75	4 700 6 000 7 200	140 170 190	30	10	M 8	25	3,3	4200-090301-000000
100	170	49	34	44	70 75 80	6 300 7 500 9 000	180 200 220	30	12	M 8	35	4,4	4200-100301-000000
110	185	56	39	50	75 80 85	7 200 9 000 10 400	190 220 240	59	9	M 10	40	6,0	4200-110301-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

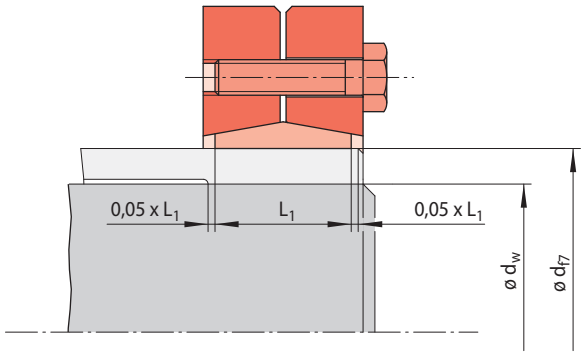
Shrink Discs RLK 603

three-part design
high transmissible torques



Shrink Disc released

22-1



Shrink Disc clamped

22-2

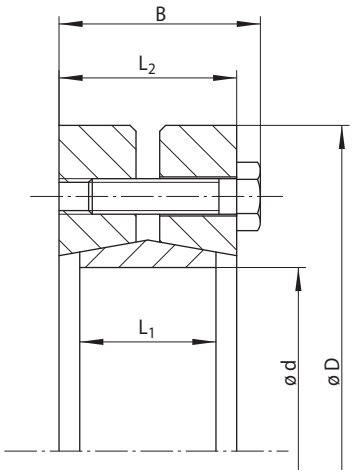
Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Clamping screws				Weight	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
115	185	56	39	50	80 85 90	8 500 9 300 11 300	210 210 250	59	9	M 10	40	6,0	4200-115301-000000
120	215	58	42	52	80 85 90	10 500 12 100 14 400	260 280 320	59	12	M 10	40	9,0	4200-120301-000000
125	215	58	42	52	85 90 95	11 000 13 000 15 000	250 280 310	59	12	M 10	40	8,7	4200-125301-000000
130	215	58	42	52	90 95 100	12 000 14 400 17 000	260 300 340	59	12	M 10	40	8,3	4200-130301-000000
140	230	68	46	60	95 100 105	14 900 17 000 20 000	310 340 380	100	10	M 12	45	10,7	4200-140301-000000
155	265	72	50	64	105 110 115	20 000 23 000 26 000	380 410 450	100	12	M 12	50	16,0	4200-155301-000000
160	265	72	50	64	110 115 120	21 900 25 200 28 600	390 430 470	100	12	M 12	50	15,4	4200-160301-000000
165	290	81	56	71	115 120 125	31 500 35 600 39 000	540 590 620	250	8	M 16	60	21,7	4200-165301-000000
170	290	81	56	71	120 125 130	31 700 35 800 40 000	520 570 610	250	8	M 16	60	21,1	4200-170301-000000
175	300	81	56	71	125 130 135	34 500 38 900 43 400	550 590 640	250	8	M 16	60	22,7	4200-175301-000000
180	300	81	56	71	130 135 140	36 700 41 100 45 700	560 600 650	250	8	M 16	60	22,0	4200-180301-000000
185	330	96	71	86	135 140 145	49 200 54 600 60 400	720 780 830	250	10	M 16	65	35,0	4200-185301-000000
190	330	96	71	86	140 145 150	51 900 57 400 63 200	740 790 840	250	10	M 16	65	34,1	4200-190301-000000
195	350	96	71	86	140 150 155	61 600 74 500 81 300	880 990 1 040	250	12	M 16	65	39,6	4200-195301-000000
200	350	96	71	86	150 155 160	71 200 77 900 84 700	940 1 000 1 050	250	12	M 16	65	38,7	4200-200301-000000
220	370	114	88	104	160 165 170	90 700 98 600 106 000	1 130 1 190 1 240	250	15	M 16	80	50,0	4200-220301-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Shrink Discs RLK 603

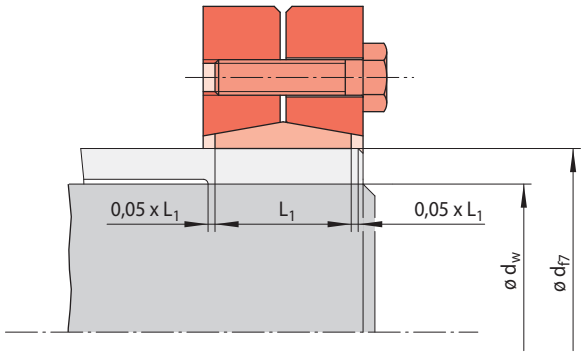
RINGSPANN®

three-part design
high transmissible torques



Shrink Disc released

23-1



Shrink Disc clamped

23-2

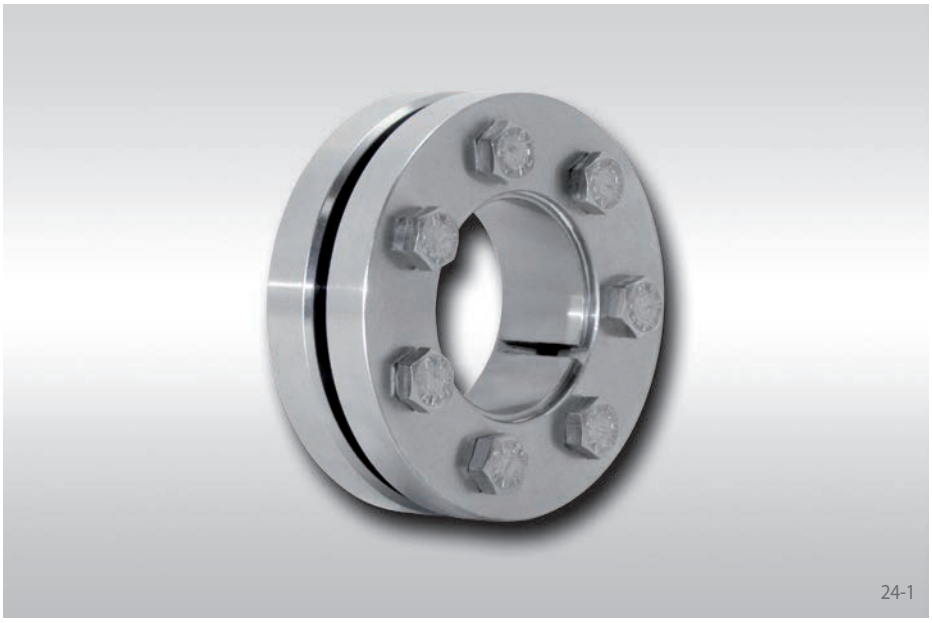
Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Clamping screws				Weight	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
240	405	121	92	108	170 180 190	119 000 138 000 156 000	1 400 1 530 1 640	490	12	M 20	80	62,0	4200-240301-000000
260	430	133	103	120	190 200 210	161 000 184 000 204 000	1 690 1 840 1 940	490	14	M 20	90	77,0	4200-260301-000000
280	460	147	114	134	210 220 230	213 000 240 000 269 000	2 020 2 180 2 330	490	16	M 20	100	97,0	4200-280301-000000
300	485	155	122	142	230 240 245	274 000 296 000 316 000	2 380 2 460 2 570	490	18	M 20	100	116,0	4200-300301-000000
320	520	155	122	142	240 250 260	310 000 340 000 373 000	2 580 2 720 2 860	490	20	M 20	100	133,0	4200-320301-000000
340	570	169	134	156	250 260 270	381 000 412 000 453 000	3 040 3 160 3 350	490	24	M 20	110	183,0	4200-340301-000000
360	590	175	140	162	280 290 295	453 000 495 000 517 000	3 230 3 410 3 500	490	24	M 20	110	186,0	4200-360301-000000
380	645	183	144	168	290 300 310	570 000 610 000 660 000	3 900 4 070 4 260	840	20	M 24	120	239,0	4200-380301-000000
390	660	183	144	168	300 310 320	625 000 670 000 720 000	4 170 4 325 4 500	840	21	M 24	120	260,0	4200-390301-000000
400	680	183	144	168	315 320 330	671 000 695 000 745 000	4 270 4 340 4 500	840	21	M 24	120	280,0	4200-400301-000000
420	690	203	164	188	330 340 350	782 000 841 000 902 000	4 460 5 000 5 200	840	24	M 24	130	316,0	4200-420301-000000
440	750	217	177	202	340 350 360	805 000 861 000 920 000	4 760 4 930 5 120	840	24	M 24	140	408,0	4200-440301-000000
460	770	217	177	202	360 370 380	1 000 000 1 073 000 1 141 000	5 560 5 820 6 020	840	28	M 24	140	420,0	4200-460301-000000
480	800	228	188	213	380 390 400	1 175 000 1 250 000 1 312 000	6 200 6 450 6 580	840	30	M 24	140	505,0	4200-480301-0000000
500	850	230	188	213	400 410 420	1 314 000 1 382 000 1 460 000	6 570 6 740 7 000	1 250	24	M 27	150	575,0	4200-500301-0000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Shrink Discs RLK 603 K

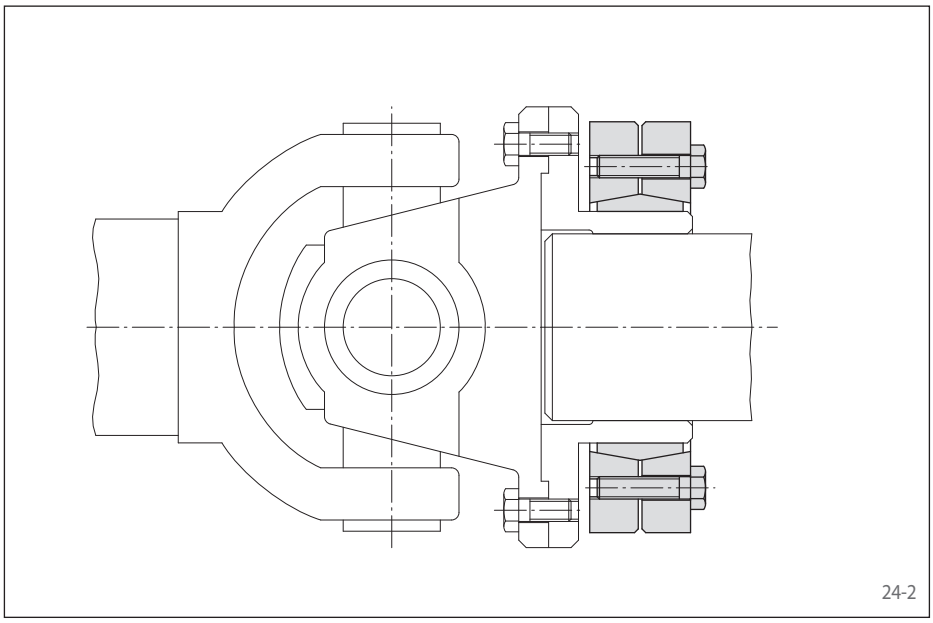
RINGSPANN®

three-part design
corrosion-resistant in stainless steel


24-1

Features

- High transmissible torques
- Tightening of clamping screws with a torque wrench
- Easy disassembly without jacking screws
- Centres the hollow shaft or hub to the shaft
- For hollow shafts or hubs with outer diameters of 24 mm up to 175 mm
- All parts in rust-free stainless steel
- High corrosion resistance
- Screws DIN 931/933 grade A2-70


24-2

Application example

Connection of a cardan shaft flange to a machine shaft in a filling machine with a Shrink Disc RLK 603 K. Connection is resistant to detergents and guarantees a safe torque transmission.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 25 through 26 are subject to the following tolerances, surface characteristics and material requirement. Please contact us in the case of deviations.

Tolerances

d_w > mm	d_w ≤ mm	Hollow shaft bore ISO	Shaft ISO	Joint clearance max. mm
6	10	H6	j6	0,011
11	18			0,014
19	30			0,017
31	50	H6	h6	0,032
51	80	H6	g6	0,048
81	120	H7	g6	0,069
121	180			0,079
181	250			0,090
251	315			0,101
316	400			0,111
401	500			0,123

Other fits may be selected, provided the joint clearance between the shaft and the hollow shaft remains within the indicated ranges.

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hollow shaft:

- Yield strength $R_e \geq 300$ N/mm^2
- E-module ca. 200 kN/mm^2

Installation

Please request our installation and operating instructions for Shrink Discs RLK 603 K.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 28 and 29.

Example for ordering

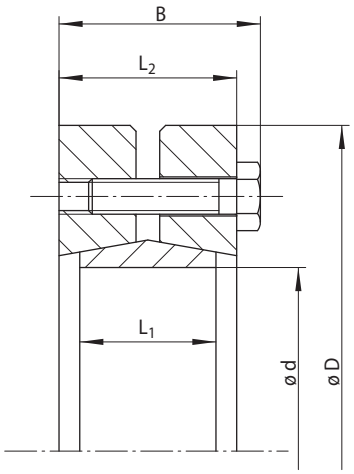
Shrink Disc RLK 603 K for hollow shaft with an outer diameter d = 100 mm:

- RLK 603 K-100
  Article number 4200-100310-000000

Shrink Discs RLK 603 K

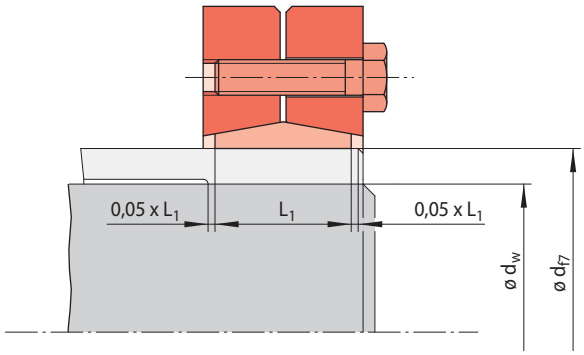
RINGSPANN®

three-part design
corrosion-resistant in stainless steel



Shrink Disc released

25-1



Shrink Disc clamped

25-2

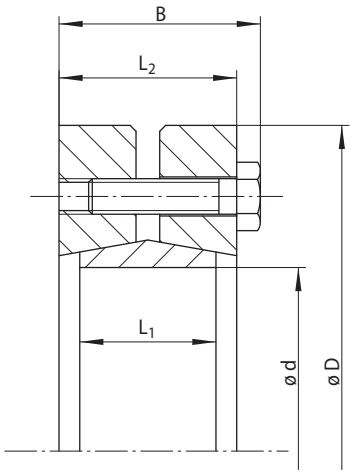
Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Spannschrauben				Weight	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
24	50	21,5	14	18	19 20 21	170 200 240	18 20 22	3,9	6	M 5	16	0,19	4200-024310-000000
30	60	23,5	16	20	24 25 26	200 220 240	16 18 19	3,9	7	M 5	18	0,29	4200-030310-000000
36	72	26,0	18	22	28 30 31	260 330 350	18 22 23	6,8	5	M 6	20	0,47	4200-036310-000000
44	80	28,0	20	24	34 35 36	350 440 480	22 25 27	6,8	7	M 6	20	0,6	4200-044310-000000
50	90	31,0	22	27	38 40 42	530 620 730	28 31 35	6,8	8	M 6	22	0,8	4200-050310-000000
55	100	33,0	23	29	42 45 48	680 850 1 050	32 37 45	6,8	8	M 6	25	1,1	4200-055310-000000
62	110	33,0	23	29	48 50 52	1 000 1 200 1 350	43 50 52	6,8	10	M 6	25	1,3	4200-062310-000000
68	115	33,0	23	29	50 55 60	1 100 1 400 1 750	45 51 57	6,8	10	M 6	25	1,3	4200-068310-000000
75	138	36,3	25	31	55 60 65	1 300 1 700 2 050	48 53 64	16	7	M 8	25	2,2	4200-075310-000000
80	145	36,3	25	31	60 65 70	1 700 2 050 2 350	53 64 69	16	7	M 8	25	2,4	4200-080310-000000
85	155	43,3	30	38	60 65 70	2 400 2 450 2 500	70 72 74	16	10	M 8	30	3,4	4200-085310-000000
90	155	43,3	30	38	65 70 75	2 550 3 200 3 800	75 91 101	16	10	M 8	30	3,3	4200-090310-000000
95	170	48,3	34	43	65 70 75	2 600 2 800 3 100	76 94 102	16	12	M 8	35	4,6	4200-095310-000000
100	170	48,3	34	43	70 75 80	3 300 4 000 4 800	96 107 117	16	12	M 8	35	4,4	4200-100310-000000
110	185	55,4	39	49	75 80 85	3 900 4 800 5 600	103 119 130	32	9	M 10	40	5,9	4200-110310-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Shrink Discs RLK 603 K

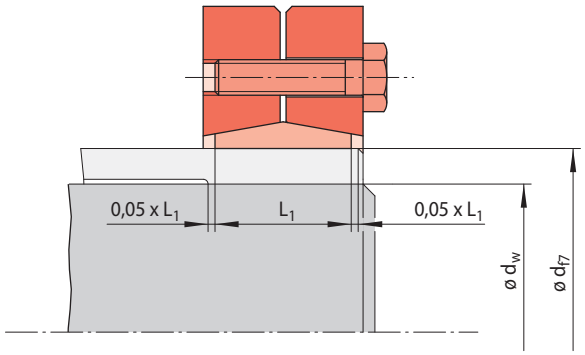
RINGSPANN®

three-part design
corrosion-resistant in stainless steel



Shrink Disc released

26-1



Shrink Disc clamped

26-2

Dimensions						Technical Data							Article number
						Transmissible torque or axial force		Spannschrauben				Gewicht	
Size d mm	D mm	B mm	L_1 mm	L_2 mm	d_w* mm	M Nm	F kN	Tightening torque M_S Nm	Number	Size	Length mm	kg	
125	215	59,4	42	53	85 90 95	5 900 7 000 8 100	136 152 168	32	12	M 10	40	8,7	4200-125310-000000
130	215	59,4	42	53	90 95 100	6 500 7 800 9 200	141 163 184	32	12	M 10	40	8,4	4200-130310-000000
140	230	65,5	46	58	95 100 105	8 100 9 300 11 000	171 187 209	55	10	M 12	45	10,0	4200-140310-000000
165	290	78,0	56	68	115 120 125	17 000 19 000 21 000	292 319 346	135	8	M 16	55	21,0	4200-165310-000000
175	300	78,0	56	68	125 130 135	18 500 21 000 23 000	297 319 346	135	8	M 16	55	21,0	4200-175310-000000

* The shaft diameters d_w listed in the table are selected examples. For other shaft diameters d_w see the technical specifications on page 28.

Technical Points for Shrink Discs

Shaft diameter d_w

The values for the transmissible torques M or axial forces F given in the tables are calculated for exemplary shaft diameters d_w. Values for shaft diameter d_w that fall between the shaft diameters d_w stated in the table can be determined with sufficient accuracy by interpolation. Please contact us for shaft diameters d_w which are smaller than those given in the tables. We will gladly calculate the transmissible torques M or axial forces F for you.

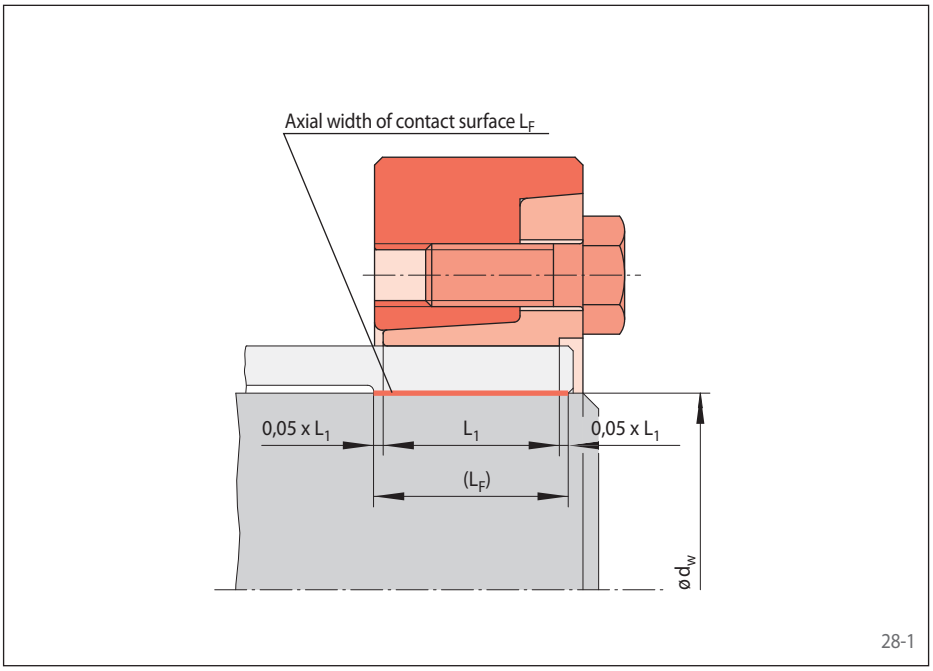
Axial width of contact surface L_F

The transmission of torque or axial force is achieved through the contact surface between shaft and hollow shaft. The pressure created by the Shrink Disc decreases strongly in areas that go beyond the bearing axial width L_1 of the Shrink Disc. In such areas with low pressure, there may be micro movements that allow the formation of harmful fretting corrosion.

The axial width of contact surface L_F should therefore be limited to:

$L_F \leq 1{,}1 \cdot L_1$

For contact surfaces with a width that is smaller than L_1, there is an increased pressure generated which may damage the shaft and/or hollow shaft or the hub. Please contact us.



Joint clearance between shaft and hollow shaft

When the joint clearance exceeds the value given in the tables, the transmissible torque or the transmissible axial force decreases. Additionally, the equivalent stress in the hollow shaft increases in this case. Please contact us.

If the joint clearance is lower than indicated, the Shrink Disc, shaft or hollow shaft may be damaged during assembly or the torque listed in the tables can no longer be transmitted. Please contact us.

Friction value

The values listed in the tables for transmissible torques M or axial forces F assume a friction value of μ=0,15 in the contact surface between shaft and hollow shaft. This value is safely achieved in a dry and degreased steel/steel pairing.

For different friction values, the transmissible torque or axial force will change proportionally.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced compared to the values listed in the tables for M and F.

For a given axial force F_A, the reduced torque M_{red} is calculated as:

$$M_{red} = \sqrt{M^2 - (F_A \cdot \frac{d_w}{2})^2}$$

For a given torque M_A, the reduced axial force F_{red} is calculated as:

$$F_{red} = \frac{2}{d_w} \sqrt{M^2 - M_A{}^2}$$

Formula symbols

d_w = Shaft diameter / inner diameter of hollow shaft according to table [mm]

F = Transmissible axial force according to table [kN]

F_A = Maximum actual application axial force [kN]

F_{red} = Reduced axial force [kN]

L_1 = Load-bearing axial width of Shrink Disc according to table [mm]

L_F = Axial width of contact surface [mm]

M = Transmissible torque according to table [Nm]

M_A = Maximum actual application torque [Nm]

M_{red} = Reduced torque [Nm]

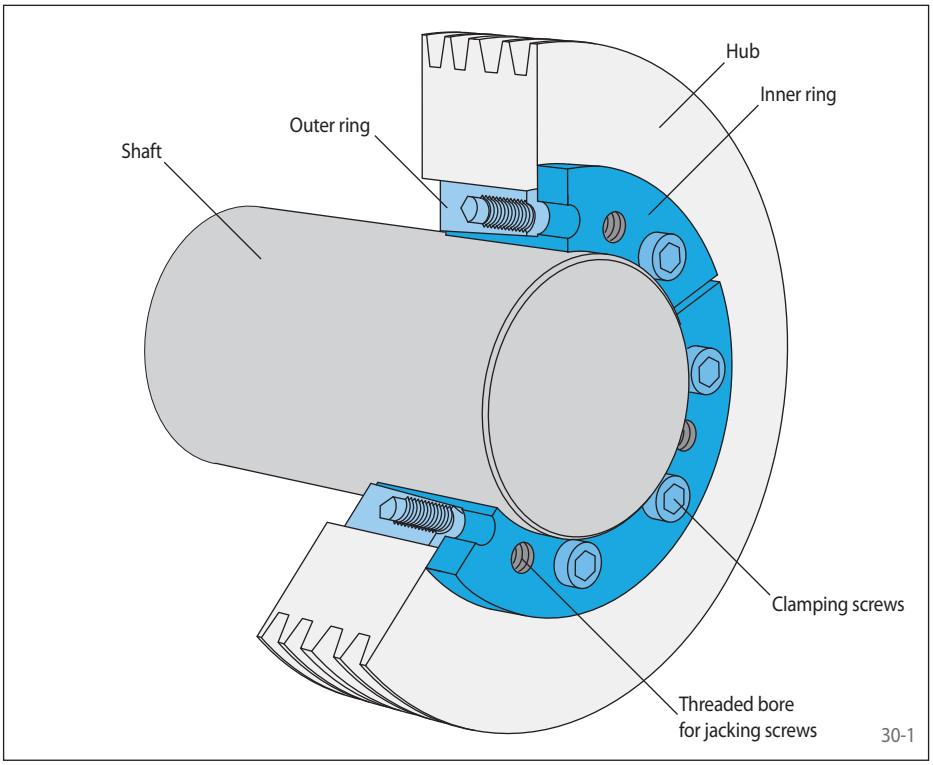
μ = Friction value

Cone Clamping Elements as shown in figure 30-1 consist of an outer ring with inside cone and an inner ring with outside cone as well as a number of clamping screws.

The outer ring is pulled onto the inner ring by tightening the clamping screws. Radial clamping forces are generated by the conical surfaces which are dependent on the torques of the clamping screws, the cone angle and the friction coefficients at the screws and conical surfaces.

The radial clamping forces press the outer ring into the hub bore and the inner ring onto the shaft and create a frictional connection at the respective contact surfaces. In this way, torque and/or axial force can be transmitted between the shaft and the hub.

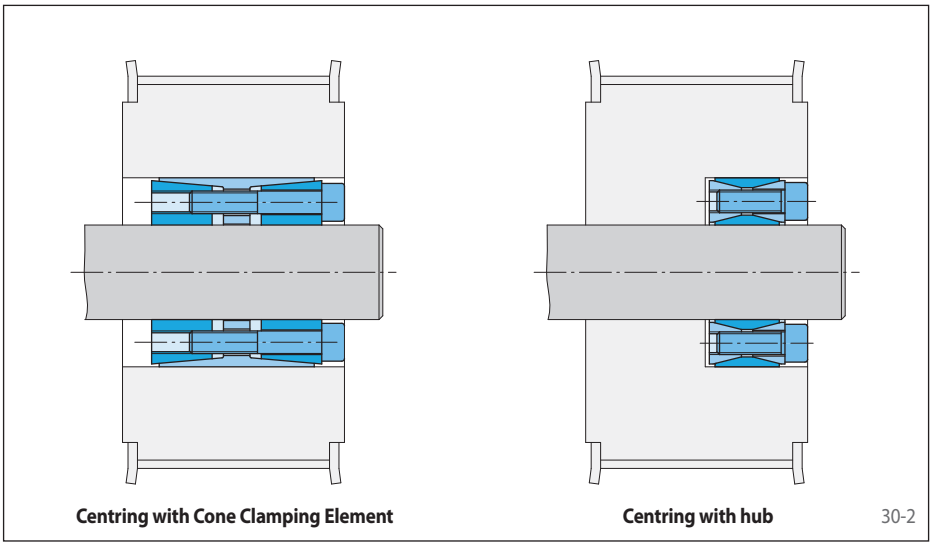
In the configuration shown in the illustration, the connection is released by turning some of the clamping screws into the threaded bores for the jacking screws. This presses off the outer ring.



30-1

Centring the hub to the shaft

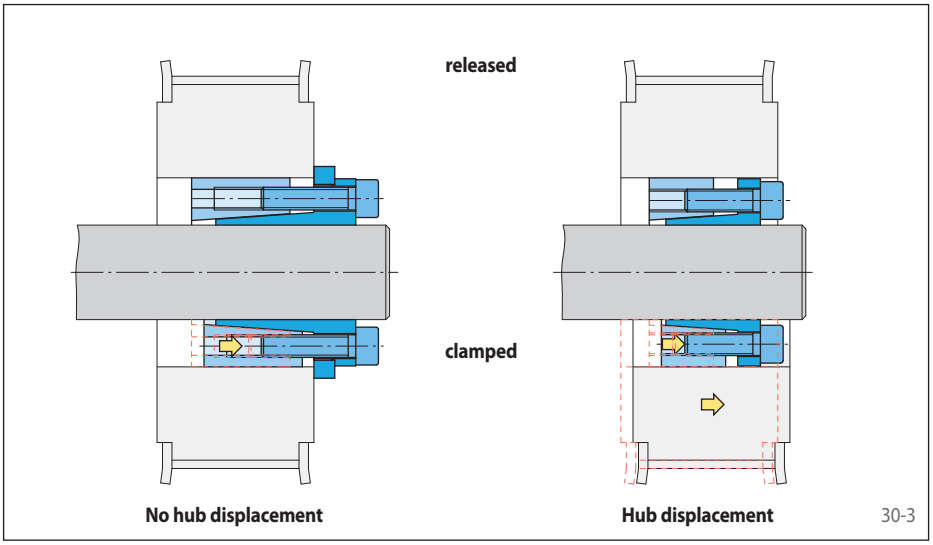
As a rule, a true running accuracy of the hub to the shaft of 0,02 to 0,04 mm can be achieved with Cone Clamping Elements. Exceptions are the Cone Clamping Elements of the series RLK 200 and RLK 300. With these series the hub must be centred to the shaft in accordance with the specific requirements of the application.



30-2

No axial displacement of the hub relative to the shaft during clamping

The overview table on pages 8 and 9 shows the series for which no axial displacement of the hub relative to the shaft is created during the clamping procedure. This is ensured, for example, by a fixed hub backstop point on the collar of the inner ring. For all other series, the clamping procedure (tightening the clamping screws and pulling the outer ring onto the inner ring) involves an axial hub displacement.



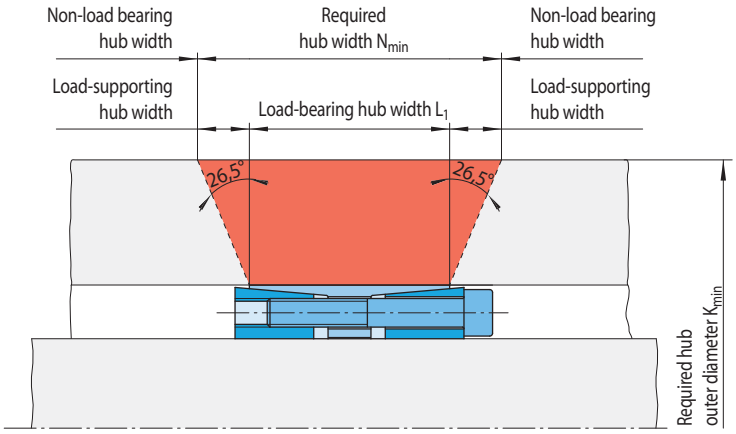
30-3

Frictional shaft-hub-connections with Cone Clamping Elements create very high radial clamping forces. This requires a hardness analysis of shaft and hub. For this, the Cone Clamping Element tables list the maximum pressures P_w in the contact surface at the shaft and the maximum pressures P_N in the contact surface at the hub.

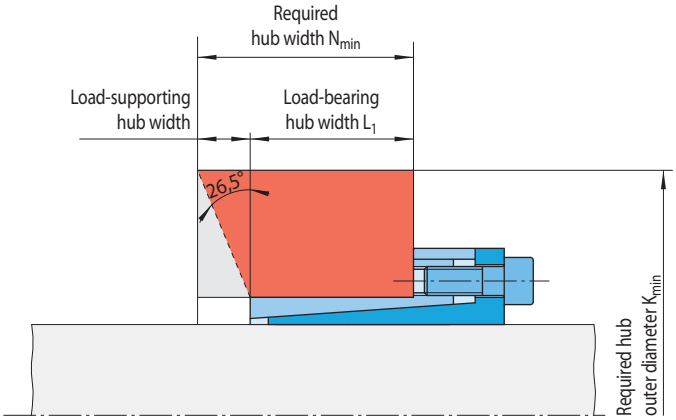
The contact pressure P_w leads to radial stress in the shaft that is usually not critical for steel shafts. There is always a tangential stress σ_t in the hub, and for thin-walled hubs it may be a multiple of the initiated pressure P_N. The amount of the actual tangential stress depends on the hub width, the hub outer diameter and the pressure. Calculation of required hub width N_{min} takes into account the fact that hub pressure P_N is transmitted by load-bearing hub width L_1 and taken up beyond it in an angle of approximately 26,5° (see figure 31-1).

For the different Cone Clamping Element series, the tables list the required hub width N_{min} and the required hub outer diameter K_{min} for three exemplary yield strengths R_e of the hub. Thereby, the hub is to be arranged as seen in figure 31-2 for Cone Clamping Elements with a fixed backstop point.

For any deviating hub arrangement and/or lower yield strengths R_e of the hub material, the shaft-hub-connection must be verified according to the technical points on pages 64 and 65.



Load-bearing hub width 31-1



Hub arrangement for Cone Clamping Elements with a fixed backstop point 31-2

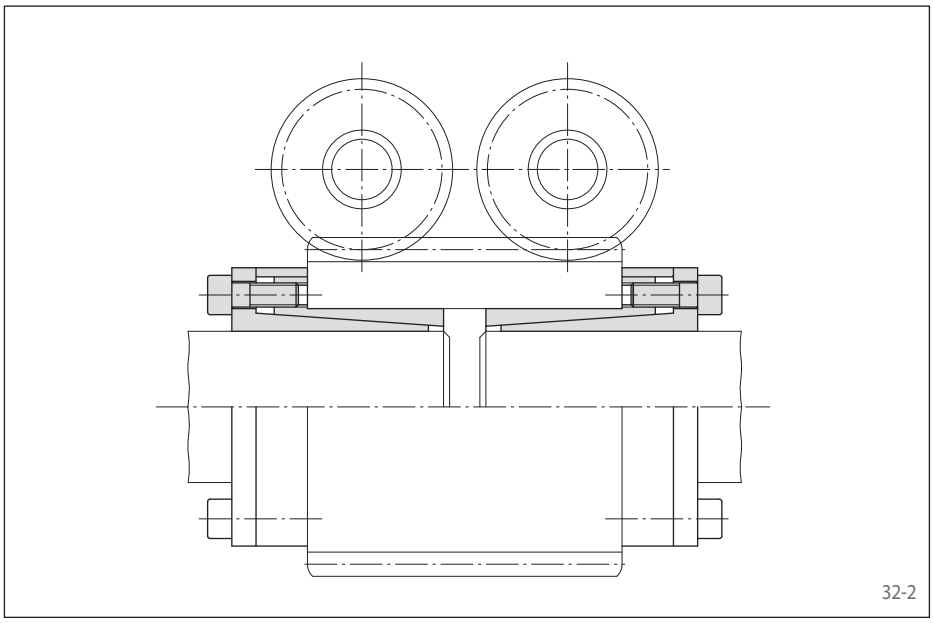
Cone Clamping Elements RLK 110

RINGSPANN®

centres the hub to the shaft
radial flat height

Features

- Centres the shaft to the hub
- High transmissible torques
- Radial flat height is particularly suitable for small hub outer diameters
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 6 mm and 120 mm



Application example

Backlash free connection of a screw gear and simultaneous coupling of the divided drive shaft of a continuous heating furnace with two Cone Clamping Elements RLK 110. A simple and cost-effective solution, because clamping the screw gear and coupling the shaft ends is achieved simultaneously by the Cone Clamping Elements.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 33 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 110.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

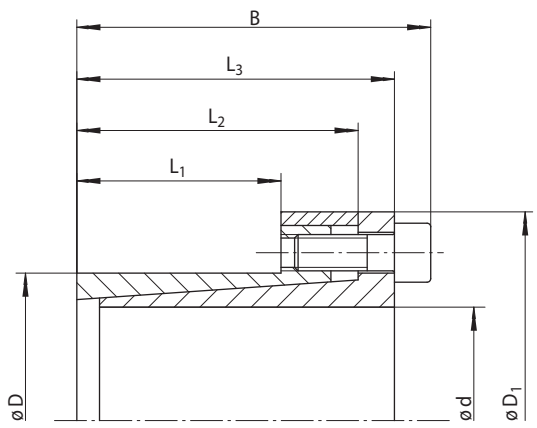
Cone Clamping Element RLK 110 for shaft diameter d = 100 mm:

- RLK 110, size 100 x 125
  Article number 4206-100001-000000

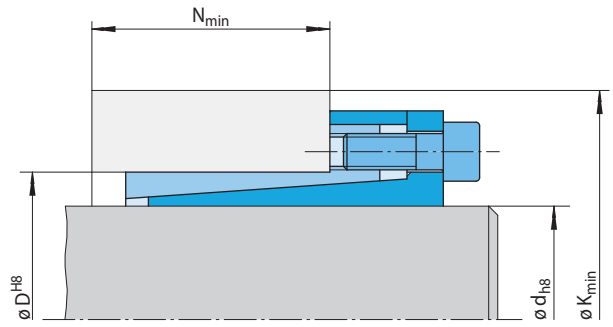
Cone Clamping Elements RLK 110

RINGSPANN®

centres the hub to the shaft
radial flat height



33-1



33-2

Dimensions														Technical Data									Article number
							Yield strength R_e of the hub material [N/mm²]							Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size							200		320		500					Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}		M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
6	14	25	24	10	19	21	32	15	23	12	19	11		15	5	257	110	1,8	4	M 3	10	0,1	4206-006001-000000
8	15	27	29	12	22	25	40	18	27	15	21	13		27	6,8	214	114	4,5	3	M 4	10	0,1	4206-008001-000000
9	16	28	30	14	23	26	47	22	30	18	23	16		41	9,1	218	122	4,5	4	M 4	10	0,1	4206-009001-000000
10	16	29	30	14	23	26	47	22	30	18	23	16		45	9,1	196	122	4,5	4	M 4	10	0,2	4206-010001-000000
11	18	32	30	14	23	26	45	20	31	17	25	15		50	9,1	178	109	4,5	4	M 4	10	0,2	4206-011001-000000
12	18	32	30	14	23	26	45	20	31	17	25	15		54	9,1	163	109	4,5	4	M 4	10	0,2	4206-012001-000000
14	23	38	30	14	23	26	43	19	34	17	29	16		64	9,1	140	85	4,5	4	M 4	10	0,2	4206-014001-000000
15	24	44	42	16	29	36	86	32	53	23	39	20		150	20	257	161	15	4	M 6	18	0,2	4206-015001-000000
16	24	44	42	16	29	36	86	32	53	23	39	20		160	20	241	161	15	4	M 6	18	0,3	4206-016001-000000
17	26	47	44	18	31	38	76	31	49	24	38	21		180	22	215	141	16	4	M 6	18	0,3	4206-017001-000000
18	26	47	44	18	31	38	76	31	49	24	38	21		190	22	203	141	16	4	M 6	18	0,3	4206-018001-000000
19	27	48	44	18	31	38	75	30	49	24	39	21		200	22	192	135	16	4	M 6	18	0,3	4206-019001-000000
20	28	49	44	18	31	38	73	29	50	24	40	21		210	22	183	130	16	4	M 6	18	0,3	4206-020001-000000
22	32	54	51	25	38	45	59	32	46	29	40	27		230	22	120	82	16	4	M 6	18	0,3	4206-022001-000000
24	34	56	51	25	38	45	59	31	47	28	42	27		260	22	110	77	16	4	M 6	18	0,3	4206-024001-000000
25	34	56	51	25	38	45	59	31	47	28	42	27		270	22	105	77	16	4	M 6	18	0,3	4206-025001-000000
28	39	61	51	25	38	45	81	36	60	30	51	28		450	33	141	101	16	6	M 6	18	0,4	4206-028001-000000
30	41	62	51	25	38	45	81	35	61	30	53	28		480	33	132	96	16	6	M 6	18	0,4	4206-030001-000000
32	43	65	51	25	38	45	102	40	72	32	59	29		690	43	164	122	16	8	M 6	18	0,5	4206-032001-000000
35	47	69	56	30	43	50	91	41	70	36	60	33		760	43	125	93	16	8	M 6	18	0,5	4206-035001-000000
38	50	72	56	30	43	50	92	41	72	36	63	33		820	43	115	88	16	8	M 6	18	0,6	4206-038001-000000
40	53	75	56	30	43	50	93	40	74	35	66	33		860	43	110	83	16	8	M 6	18	0,6	4206-040001-000000
42	55	78	65	32	50	57	145	55	99	43	79	38		1 550	76	171	130	37	8	M 8	22	0,9	4206-042001-000000
45	59	85	73	40	57	65	125	57	91	48	77	45		1 700	76	127	97	37	8	M 8	22	1,0	4206-045001-000000
48	62	87	78	45	62	70	116	59	90	52	78	49		1 800	76	106	82	37	8	M 8	22	1,0	4206-048001-000000
50	65	92	78	45	62	70	139	64	101	54	85	50		2 350	95	127	98	37	10	M 8	22	1,3	4206-050001-000000
55	71	98	83	50	67	75	131	65	102	58	89	55		2 500	95	104	81	37	10	M 8	22	1,5	4206-055001-000000
60	77	104	83	50	67	75	133	64	107	58	94	54		2 800	95	96	74	37	10	M 8	22	1,7	4206-060001-000000
65	84	111	83	50	67	75	136	63	112	57	101	54		3 000	95	88	68	37	10	M 8	22	1,9	4206-065001-000000
70	90	119	101	60	80	91	169	80	131	70	113	66		5 200	149	109	85	73	10	M 10	25	2,9	4206-070001-000000
75	95	126	101	60	80	91	170	79	134	70	118	66		5 600	149	101	80	73	10	M 10	25	2,3	4206-075001-000000
80	100	131	106	65	85	96	187	87	145	76	126	72		7 100	179	105	84	73	12	M 10	25	3,3	4206-080001-000000
85	106	137	106	65	85	96	188	86	149	76	131	71		7 600	179	99	80	73	12	M 10	25	3,6	4206-085001-000000
90	112	143	106	65	85	96	221	92	168	79	144	73		10 000	224	117	94	73	15	M 10	25	4,0	4206-090001-000000
95	120	153	106	65	85	96	223	91	174	79	152	73		10 600	224	111	88	73	15	M 10	25	4,5	4206-095001-000000
100	125	162	114	65	89	102	249	96	190	81	162	74		13 000	262	122	98	126	12	M 12	30	5,5	4206-100001-000000
110	140	180	140	90	114	128	220	110	183	101	166	97		14 000	262	80	63	126	12	M 12	30	8,0	4206-110001-000000
120	155	198	140	90	114	128	230	109	197	101	180	96		15 500	262	74	57	126	12	M 12	30	10,5	4206-120001-000000

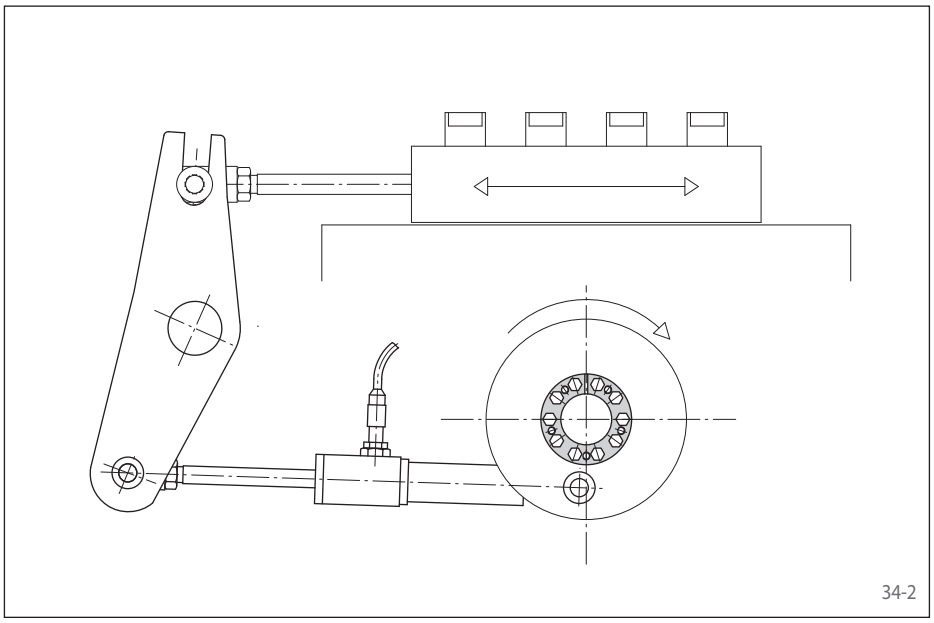
Cone Clamping Elements RLK 110 K

RINGSPANN®

centres the hub to the shaft
corrosion protected

Features

- Centres the shaft to the hub
- All parts 35 µm chemically nickel-coated for high corrosion resistance pursuant to DIN 50021 (neutral salt spray test)
- High transmissible torques
- Radial flat height is particularly suitable for small hub outer diameters
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 19 mm and 60 mm



Application example

Backlash free connection of an eccentric wheel to the drive shaft of a packaging machine with a Cone Clamping Element RLK 110 K. The turning motion is transmitted into translatory motion by a driving rod that is protected from overload by a RINGSPANN force limiter.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 35 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 110 K.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

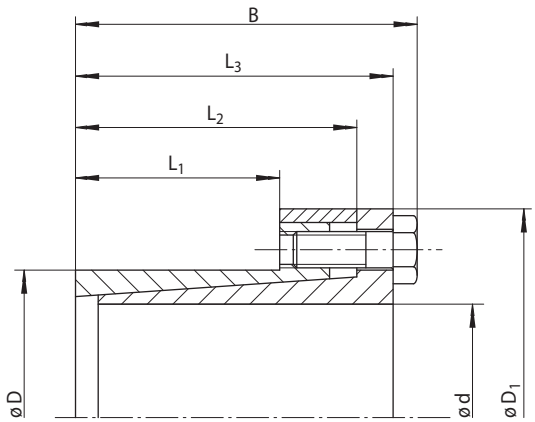
Cone Clamping Element RLK 110 K for shaft diameter d = 50 mm:

- RLK 110 K, size 50 x 65
  Article number 4206-050001-A08101

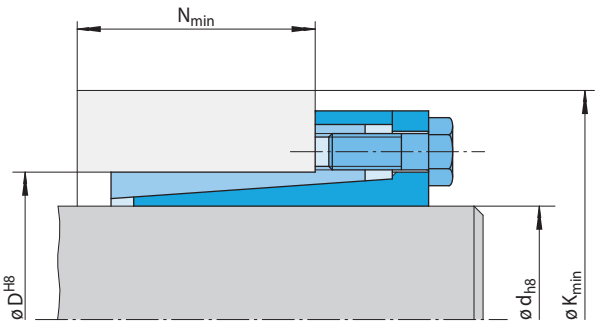
Cone Clamping Elements RLK 110 K

RINGSPANN®

centres the hub to the shaft
corrosion protected



35-1



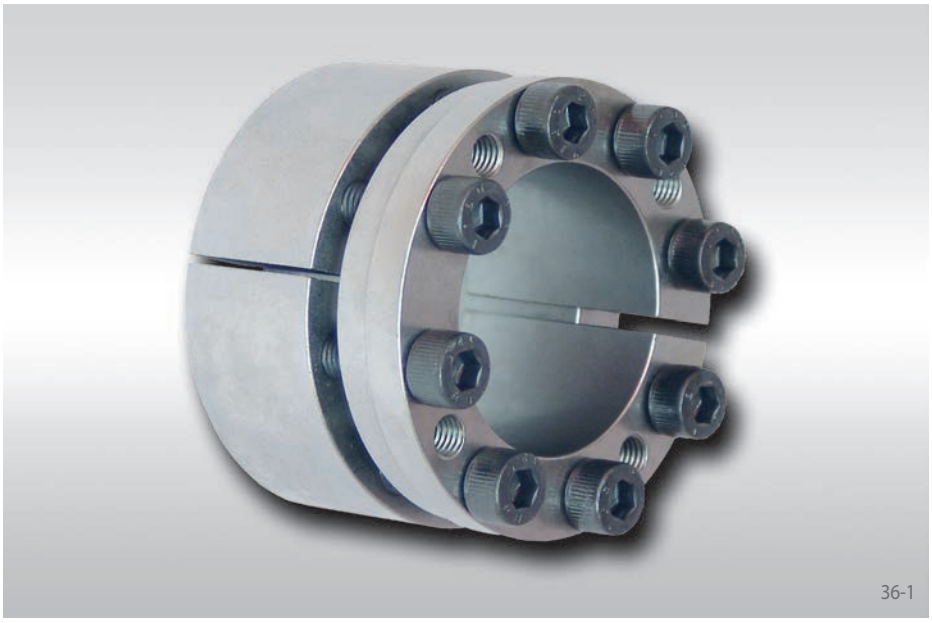
35-2

Dimensions													Technical Data									Article number
							Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size							200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
19	27	49	41	18	31	38	64	27	45	23	37	21	180	19	164	116	15	4	M 6	18	0,3	4206-019001-A08101
20	28	49	41	18	31	38	63	27	45	22	38	21	190	19	156	111	15	4	M 6	18	0,3	4206-020001-A08101
22	32	54	48	25	38	45	53	30	43	28	39	27	200	19	102	70	15	4	M 6	18	0,3	4206-022001-A08101
25	34	56	48	25	38	45	54	30	45	28	41	27	230	19	90	66	15	4	M 6	18	0,4	4206-025001-A08101
28	39	61	49	25	38	45	72	33	56	29	49	28	390	28	120	86	15	6	M 6	18	0,5	4206-028001-A08101
30	41	62	49	25	38	45	72	33	58	29	51	28	420	28	112	84	15	6	M 6	18	0,5	4206-030001-A08101
32	43	65	56	30	43	50	89	37	67	31	54	33	590	37	117	87	15	8	M 6	18	0,5	4206-032001-A08101
35	47	69	56	30	43	50	82	39	66	35	58	33	650	37	107	80	15	8	M 6	18	0,6	4206-035001-A08101
38	50	72	56	30	43	50	83	38	68	35	61	33	710	37	99	75	15	8	M 6	18	0,6	4206-038001-A08101
40	53	75	56	30	43	50	85	38	71	35	64	33	740	37	94	71	15	8	M 6	18	0,7	4206-040001-A08101
45	59	85	71	40	57	65	114	54	87	47	75	44	1 550	37	114	87	35	8	M 8	22	1,2	4206-045001-A08101
50	65	92	76	45	62	70	127	61	96	53	83	50	2 150	69	114	88	35	10	M 8	22	1,3	4206-050001-A08101
55	71	98	81	50	67	75	121	63	97	57	87	54	2 400	87	93	72	35	10	M 8	22	1,5	4206-055001-A08101
60	77	104	81	50	67	75	124	62	103	57	92	54	2 600	87	85	67	35	10	M 8	22	1,7	4206-060001-A08101

Cone Clamping Elements RLK 130

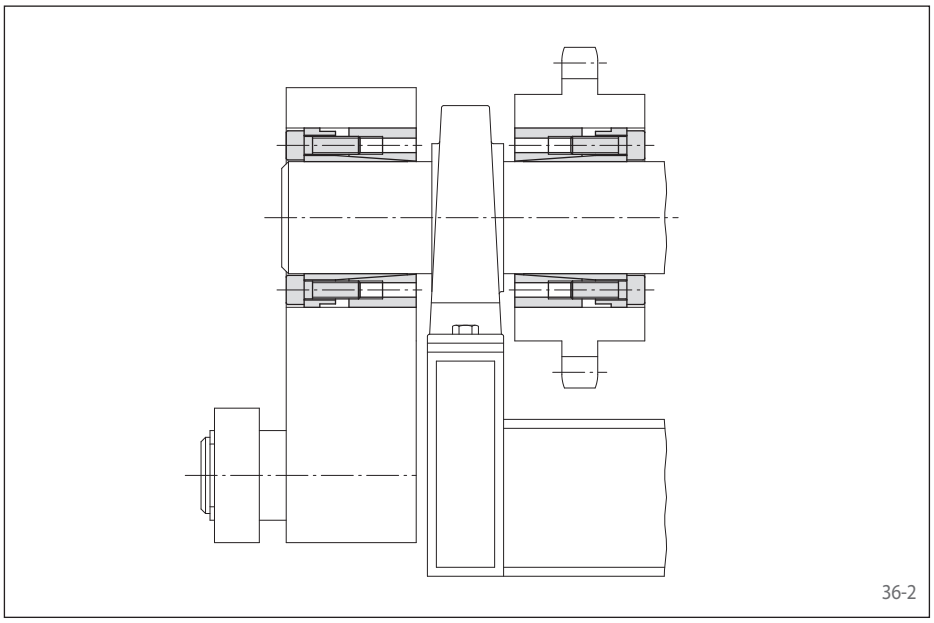
RINGSPANN®

centres the hub to the shaft
very high transmissible torque



Features

- Centres the shaft to the hub
- Very high transmissible torques
- For shaft diameters between 20 mm and 180 mm



Application example

Backlash free connection of an eccentric lift unit and a sprocket to the drive shaft of a hoisting device using Cone Clamping Elements RLK 130. The eccentric force applied to the eccentric lift unit results in the Cone Clamping Element transmitting not only torque, but also forces and bending moments.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 37 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 130.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

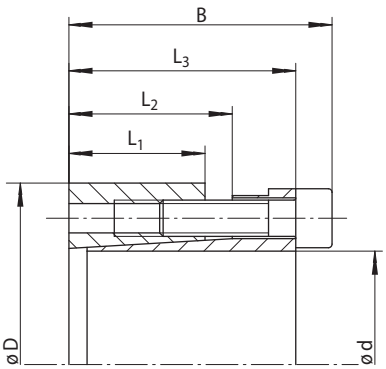
Cone Clamping Element RLK 130 for shaft diameter d = 100 mm:

- RLK 130, size 100 x 145
  Article number 4204-100001-000000

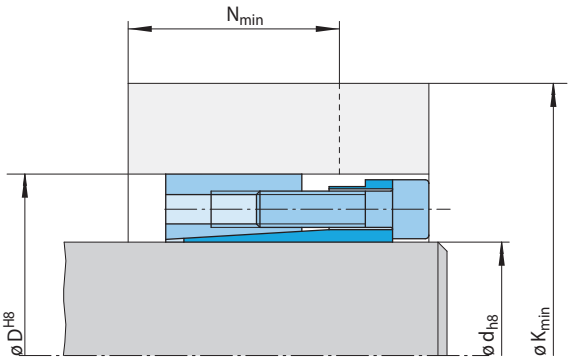
Cone Clamping Elements RLK 130

RINGSPANN®

centres the hub to the shaft
very high transmissible torque



37-1



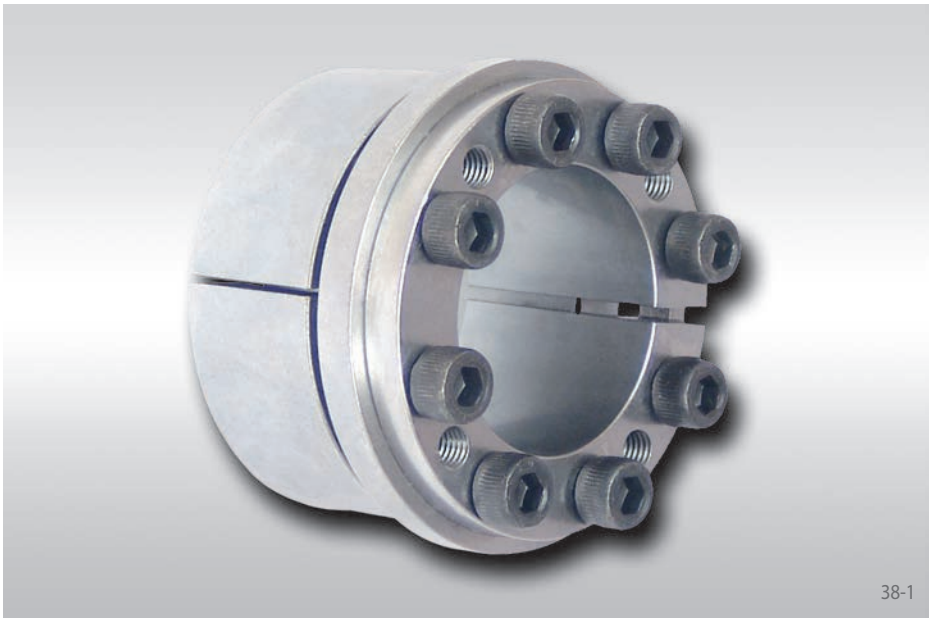
37-2

Dimensions													Technical Data									Article number
						Yield strength R_e of the hub material [N/mm²]							Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size						200		320		500					Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}		M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	48	26	31	42	93	49	74	40	64	35		520	53	309	131	16	6	M 6	25	0,4	4204-020001-000000
22	47	48	26	31	42	93	49	74	40	64	35		580	53	281	131	16	6	M 6	25	0,4	4204-022001-000000
24	50	48	26	31	42	94	48	76	39	66	34		630	53	257	123	16	6	M 6	25	0,4	4204-024001-000000
25	50	48	26	31	42	94	48	76	39	66	34		660	53	247	123	16	6	M 6	25	0,4	4204-025001-000000
28	55	48	26	31	42	97	47	80	39	71	34		740	53	220	112	16	6	M 6	25	0,5	4204-028001-000000
30	55	48	26	31	42	97	47	80	39	71	34		790	53	206	112	16	6	M 6	25	0,5	4204-030001-000000
32	60	48	26	31	42	114	53	93	43	81	37		1 100	71	257	137	16	8	M 6	25	0,5	4204-032001-000000
35	60	48	26	31	42	114	53	93	43	81	37		1 200	71	235	137	16	8	M 6	25	0,5	4204-035001-000000
38	65	48	26	31	42	117	52	97	42	85	36		1 300	71	217	127	16	8	M 6	25	0,6	4204-038001-000000
40	65	48	26	31	42	117	52	97	42	85	36		1 400	71	206	127	16	8	M 6	25	0,6	4204-040001-000000
42	75	59	30	35	51	136	61	113	49	99	42		1 900	92	222	124	37	6	M 8	30	1,0	4204-042001-000000
45	75	59	30	35	51	136	61	113	49	99	42		2 050	92	207	124	37	6	M 8	30	0,9	4204-045001-000000
48	80	59	30	35	51	160	70	129	55	111	46		2 900	123	259	155	37	8	M 8	30	1,1	4204-048001-000000
50	80	59	30	35	51	160	70	129	55	111	46		3 000	123	249	155	37	8	M 8	30	1,0	4204-050001-000000
55	85	59	30	35	51	162	69	133	54	116	46		3 300	123	226	146	37	8	M 8	30	1,1	4204-055001-000000
60	90	59	30	35	51	164	67	136	53	120	45		3 600	123	207	138	37	8	M 8	30	1,2	4204-060001-000000
65	95	59	30	35	51	167	66	140	53	125	45		3 900	123	191	131	37	8	M 8	30	1,2	4204-065001-000000
70	110	70	40	45	60	203	87	167	69	147	59		6 800	194	212	135	73	8	M 10	30	2,3	4204-070001-000000
75	115	70	40	45	60	205	85	171	68	151	58		7 200	194	198	129	73	8	M 10	30	2,5	4204-075001-000000
80	120	70	40	45	60	208	84	175	68	156	58		7 700	194	186	124	73	8	M 10	30	2,6	4204-080001-000000
85	125	70	40	45	60	233	94	193	74	169	62		10 300	243	218	149	73	10	M 10	30	2,7	4204-085001-000000
90	130	70	40	45	60	236	93	196	73	173	62		10 900	243	206	143	73	10	M 10	30	2,8	4204-090001-000000
95	135	70	40	45	60	238	92	200	73	178	62		11 500	243	195	138	73	10	M 10	30	3,2	4204-095001-000000
100	145	80	45	52	68	255	100	214	80	190	68		14 000	284	191	132	126	8	M 12	35	3,9	4204-100001-000000
110	155	80	45	52	68	261	98	222	79	199	67		15 500	284	174	123	126	8	M 12	35	4,8	4204-110001-000000
120	165	80	45	52	68	293	109	246	86	219	72		21 000	355	199	145	126	10	M 12	35	5,0	4204-120001-000000
130	180	80	45	52	68	327	117	273	92	242	76		27 500	426	221	159	126	12	M 12	35	6,0	4204-130001-000000
140	190	90	50	58	76	344	127	288	99	255	83		34 000	488	212	156	201	10	M 14	40	8,2	4204-140001-000000
150	200	90	50	58	76	386	137	314	107	276	88		43 500	586	237	178	201	12	M 14	40	8,7	4204-150001-000000
160	210	90	50	58	76	389	135	322	106	285	88		46 500	586	222	169	201	12	M 14	40	9,0	4204-160001-000000
170	225	90	50	58	76	433	142	350	113	309	92		58 000	683	244	184	201	14	M 14	40	10,0	4204-170001-000000
180	235	90	50	58	76	436	140	358	112	318	92		61 000	683	230	176	201	14	M 14	40	11,0	4204-180001-000000

Cone Clamping Elements RLK 131

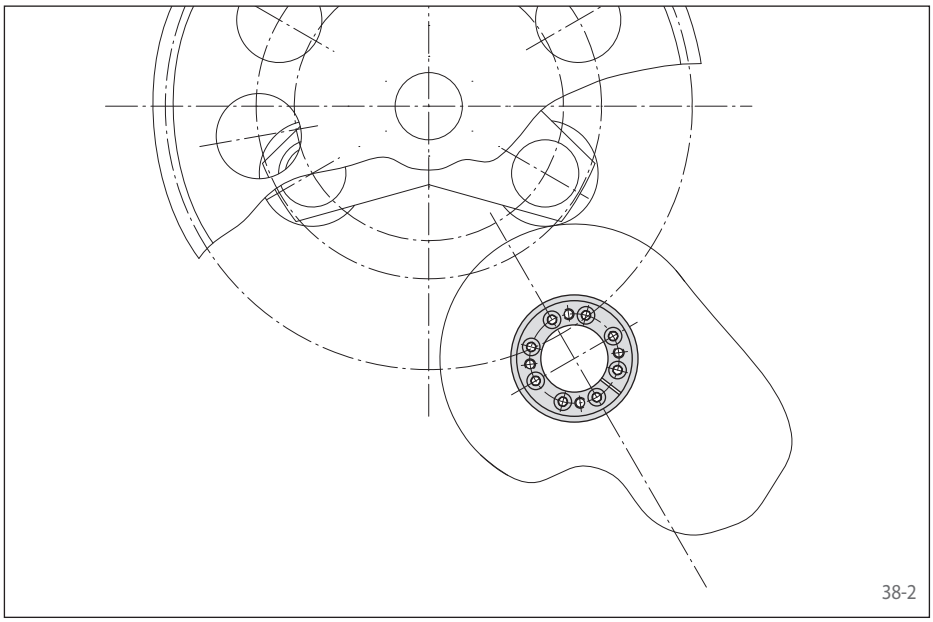
RINGSPANN®

centres the hub to the shaft
no axial displacement



Features

- Centres the shaft to the hub
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 20 mm and 180 mm



Application example

Backlash free connection of a cam disc to the drive shaft in a stepping gear in the material feed mechanism of a paper processing machine with a Cone Clamping Element RLK 131.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 39 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 131.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

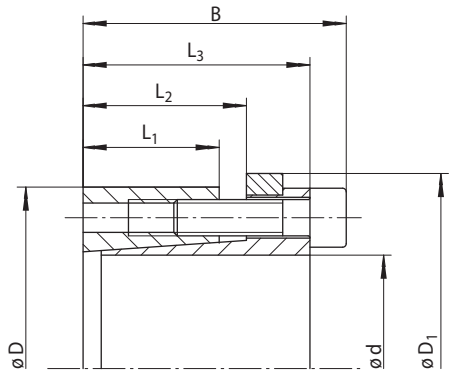
Cone Clamping Element RLK 131 for shaft diameter d = 100 mm:

- RLK 131, size 100 x 145
  Article number 4204-100101-000000

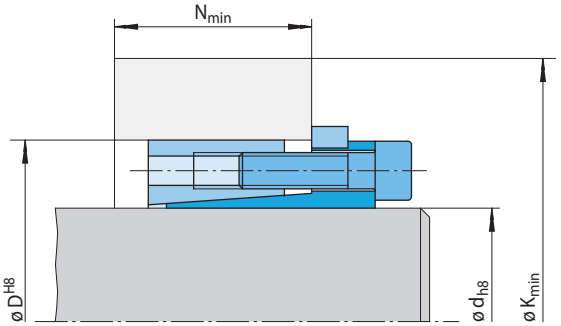
Cone Clamping Elements RLK 131

RINGSPANN®

centres the hub to the shaft
no axial displacement



39-1



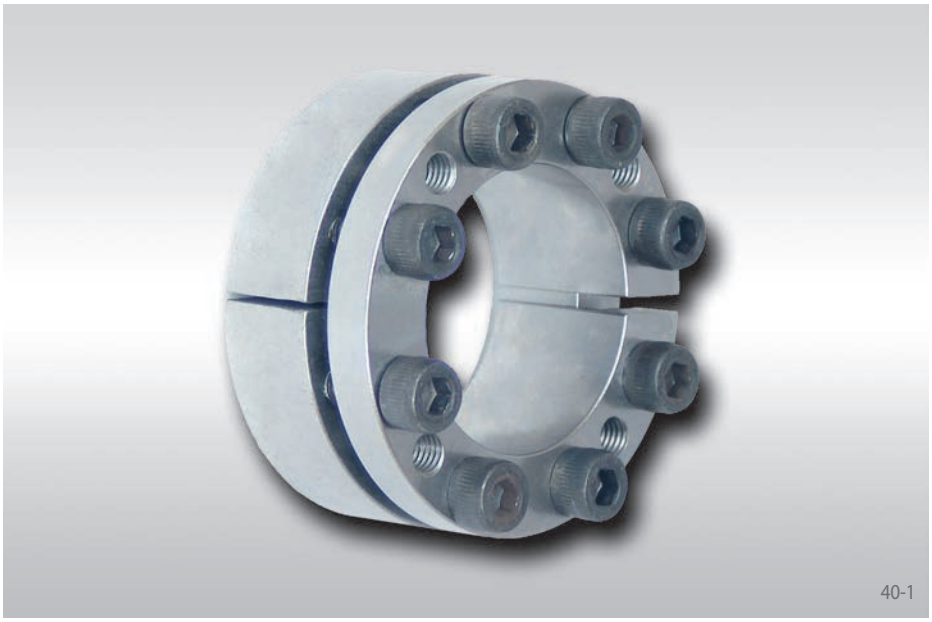
39-2

Dimensions														Technical Data									Article number
							Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size							200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	53	48	26	31	42	75	38	63	34	57	31	320	33	190	81	16	6	M 6	25	0,4	4204-020101-000000
22	47	53	48	26	31	42	75	38	63	34	57	31	350	33	172	81	16	6	M 6	25	0,4	4204-022101-000000
24	50	56	48	26	31	42	77	38	66	34	60	31	390	33	158	76	16	6	M 6	25	0,4	4204-024101-000000
25	50	56	48	26	31	42	77	38	66	34	60	31	400	33	152	76	16	6	M 6	25	0,4	4204-025101-000000
28	55	61	48	26	31	42	81	38	70	34	65	31	450	33	136	69	16	6	M 6	25	0,5	4204-028101-000000
30	55	61	48	26	31	42	81	38	70	34	65	31	480	33	126	69	16	6	M 6	25	0,5	4204-030101-000000
32	60	66	48	26	31	42	95	40	80	36	73	33	690	43	158	84	16	8	M 6	25	0,6	4204-032101-000000
35	60	66	48	26	31	42	95	40	80	36	73	33	760	43	145	84	16	8	M 6	25	0,5	4204-035101-000000
38	65	71	48	26	31	42	99	40	84	36	78	33	820	43	133	78	16	8	M 6	25	0,6	4204-038101-000000
40	65	71	48	26	31	42	99	40	84	36	78	33	860	43	126	78	16	8	M 6	25	0,6	4204-040101-000000
42	75	81	59	30	35	51	116	45	98	41	90	38	1 150	57	137	76	37	6	M 8	30	1,1	4204-042101-000000
45	75	81	59	30	35	51	116	45	98	41	90	38	1 250	57	127	76	37	6	M 8	30	1,1	4204-045101-000000
48	80	86	59	30	35	51	138	50	112	43	99	40	1 800	76	159	96	37	8	M 8	30	1,1	4204-048101-000000
50	80	86	59	30	35	51	138	50	112	43	99	40	1 850	76	153	96	37	8	M 8	30	1,1	4204-050101-000000
55	85	91	59	30	35	51	140	49	116	43	104	40	2 050	76	139	90	37	8	M 8	30	1,2	4204-055101-000000
60	90	96	59	30	35	51	143	48	121	43	109	40	2 250	76	127	85	37	8	M 8	30	1,3	4204-060101-000000
65	95	101	59	30	35	51	147	48	125	43	114	40	2 450	76	118	80	37	8	M 8	30	1,3	4204-065101-000000
70	110	119	70	40	45	60	177	62	148	55	133	51	4 100	119	130	83	73	8	M 10	30	2,4	4204-070101-000000
75	115	124	70	40	45	60	180	61	152	54	138	51	4 400	119	122	79	73	8	M 10	30	2,6	4204-075101-000000
80	120	129	70	40	45	60	184	61	157	54	143	51	4 700	119	114	76	73	8	M 10	30	2,7	4204-080101-000000
85	125	134	70	40	45	60	207	66	172	57	154	52	6 300	149	134	91	73	10	M 10	30	2,8	4204-085101-000000
90	130	139	70	40	45	60	210	65	176	57	158	52	6 700	149	127	88	73	10	M 10	30	3,0	4204-090101-000000
95	135	144	70	40	45	60	212	65	180	57	163	53	7 000	149	120	85	73	10	M 10	30	3,2	4204-095101-000000
100	145	155	80	45	52	68	225	72	191	64	174	59	8 700	175	118	81	126	8	M 12	35	4,1	4204-100101-000000
110	155	165	80	45	52	68	232	71	200	63	183	59	9 600	175	107	76	126	8	M 12	35	4,4	4204-110101-000000
120	165	175	80	45	52	68	262	76	222	66	200	61	13 000	218	123	89	126	10	M 12	35	4,7	4204-120101-000000
130	180	188	80	45	52	68	294	81	247	69	222	63	17 000	262	136	98	126	12	M 12	35	5,7	4204-130101-000000
140	190	199	90	50	58	76	309	88	260	76	233	69	20 500	300	130	96	201	10	M 14	40	6,9	4204-140101-000000
150	200	209	90	50	58	76	343	94	284	79	252	71	26 500	360	146	109	201	12	M 14	40	7,2	4204-150101-000000
160	210	219	90	50	58	76	349	93	292	79	261	71	28500	360	137	104	201	12	M 14	40	7,8	4204-160101-000000
170	225	234	90	50	58	76	384	98	319	82	284	73	35 500	420	150	113	201	14	M 14	40	8,9	4204-170101-000000
180	235	244	90	50	58	76	390	97	328	81	293	73	37 500	420	142	108	201	14	M 14	40	9,5	4204-180101-000000

Cone Clamping Elements RLK 132

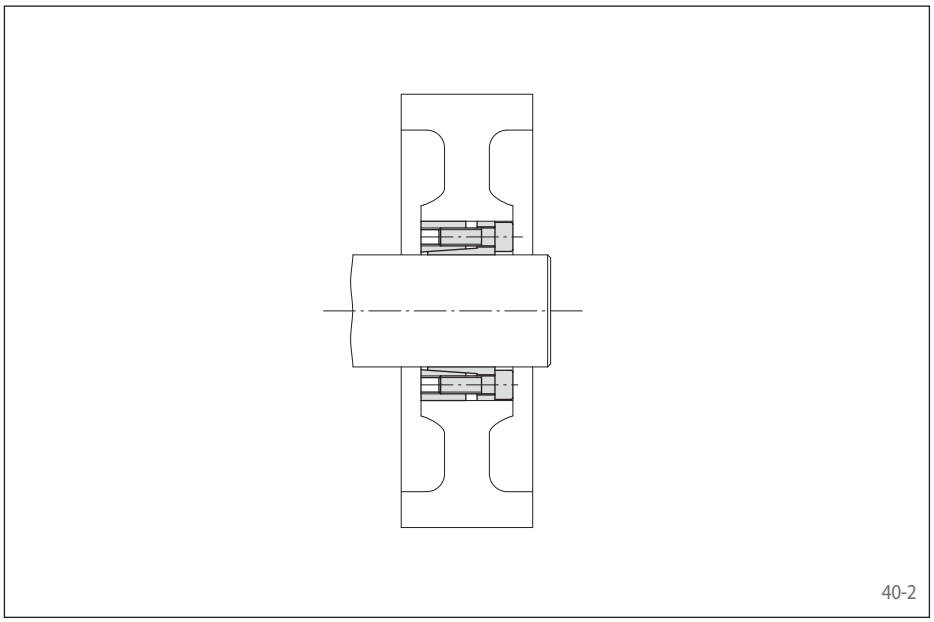
RINGSPANN®

centres the hub to the shaft
short axial width


40-1

Features

- Centres the shaft to the hub
- High transmissible torques
- Short axial width
- For shaft diameters between 20 mm and 200 mm


40-2

Application example

Backlash free connection of a belt pulley to the drive shaft with a Cone Clamping Element RLK 132. The Cone Clamping Element also centres the pulley to the shaft. The compact Cone Clamping Element is a cost-efficient solution especially for applications with low space requirements.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 41 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_z = 10 \ldots 25$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 132.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

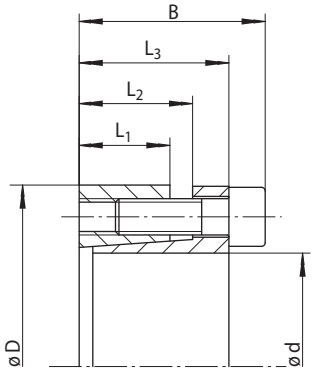
Cone Clamping Element RLK 132 for shaft diameter d = 100 mm:

- RLK 132, size 100 x 145
  Article number 4204-100201-000000

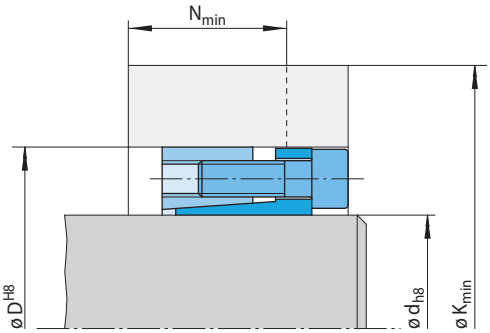
Cone Clamping Elements RLK 132

RINGSPANN®

centres the hub to the shaft
short axial width



41-1



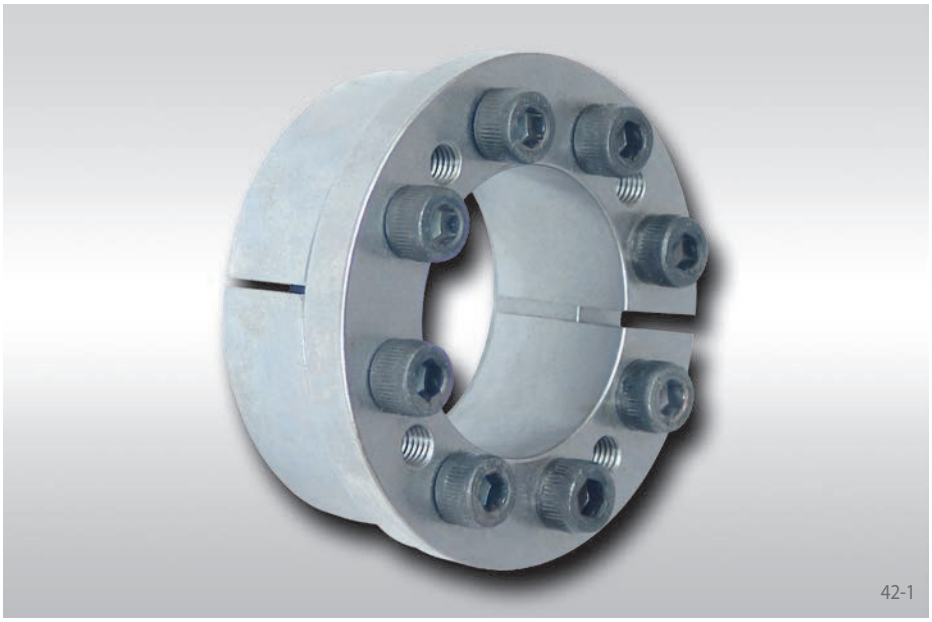
41-2

Dimensions													Technical Data									Article number
						Yield strength R_e of the hub material [N/mm²]							Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size						200		320		500					Shaft	Hub	Tightening torque	Num-ber	Size	Length		
d	D	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}		M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	34	17	22	28	92	40	75	31	65	26		460	46	413	176	14	6	M 6	20	0,3	4204-020201-000000
22	47	34	17	22	28	92	40	75	31	65	26		500	46	375	176	14	6	M 6	20	0,3	4204-022201-000000
24	50	34	17	22	28	93	39	77	31	67	26		550	46	344	165	14	6	M 6	20	0,3	4204-024201-000000
25	50	34	17	22	28	93	39	77	31	67	26		570	46	330	165	14	6	M 6	20	0,3	4204-025201-000000
28	55	34	17	22	28	96	38	81	30	72	26		640	46	295	150	14	6	M 6	20	0,3	4204-028201-000000
30	55	34	17	22	28	96	38	81	30	72	26		690	46	275	150	14	6	M 6	20	0,3	4204-030201-000000
32	60	34	17	22	28	112	43	93	34	82	28		980	62	344	184	14	8	M 6	20	0,4	4204-032201-000000
35	60	34	17	22	28	112	43	93	34	82	28		1050	62	315	184	14	8	M 6	20	0,3	4204-035201-000000
38	65	34	17	22	28	114	42	97	33	86	28		1150	62	290	169	14	8	M 6	20	0,4	4204-038201-000000
40	65	34	17	22	28	114	42	97	33	86	28		1200	62	275	169	14	8	M 6	20	0,4	4204-040201-000000
42	75	41	20	25	33	154	60	125	45	108	37		2050	100	357	200	30	8	M 8	25	0,6	4204-042201-000000
45	75	41	20	25	33	154	60	125	45	108	37		2200	100	333	200	30	8	M 8	25	0,6	4204-045201-000000
48	80	41	20	24	33	160	60	131	46	114	37		2500	106	333	200	32	8	M 8	25	0,7	4204-048201-000000
50	80	41	20	24	33	160	60	131	46	114	37		2600	106	320	200	32	8	M 8	25	0,7	4204-050201-000000
55	85	41	20	24	33	167	61	138	47	120	38		3100	113	309	200	34	8	M 8	25	0,7	4204-055201-000000
60	90	41	20	24	33	172	61	143	47	126	38		3400	116	294	196	35	8	M 8	25	0,8	4204-060201-000000
65	95	41	20	24	33	175	60	147	46	130	38		3700	116	271	186	35	8	M 8	25	0,8	4204-065201-000000
70	110	50	24	29	40	211	75	175	57	154	46		6000	173	314	200	65	8	M 10	30	1,5	4204-070201-000000
75	115	50	24	29	40	217	75	182	58	160	47		6700	181	307	200	68	8	M 10	30	1,6	4204-075201-000000
80	120	50	24	29	40	223	76	187	58	166	47		7400	186	297	198	70	8	M 10	30	1,7	4204-080201-000000
85	125	50	24	29	40	231	77	195	59	172	48		8300	196	294	200	59	10	M 10	30	1,8	4204-085201-000000
90	130	50	24	29	40	238	77	200	59	178	48		9100	203	287	199	61	10	M 10	30	1,9	4204-090201-000000
95	135	50	24	29	40	246	78	207	60	184	49		10100	213	284	200	64	10	M 10	30	2,0	4204-095201-000000
100	145	56	26	31	44	263	85	223	65	198	53		12400	248	289	199	110	8	M 12	30	2,6	4204-100201-000000
110	155	56	26	31	44	273	85	234	66	209	53		14000	259	275	195	115	8	M 12	30	2,8	4204-110201-000000
120	165	56	26	31	44	290	87	248	68	222	55		17000	284	275	200	112	9	M 12	30	3,6	4204-120201-000000
130	180	64	34	39	52	338	104	276	82	245	67		25000	389	267	193	115	12	M 12	30	4,4	4204-130201-000000
140	190	68	34	39	54	341	106	287	83	257	68		28000	404	258	190	185	9	M 14	40	4,9	4204-140201-000000
150	200	68	34	39	54	366	110	304	86	272	70		33500	449	267	200	185	10	M 14	40	5,2	4204-150201-000000
160	210	68	34	39	54	380	111	317	88	284	71		37500	472	263	200	162	12	M 14	40	5,6	4204-160201-000000
170	225	78	44	49	64	397	121	332	98	297	80		45500	539	219	165	185	12	M 14	40	6,9	4204-170201-000000
180	235	78	44	49	64	402	120	340	97	307	80		48500	539	206	158	185	12	M 14	40	8,5	4204-180201-000000
190	250	78	44	49	64	461	131	375	107	335	87		63500	674	245	186	185	15	M 14	40	9,0	4204-190201-000000
200	260	78	44	49	64	465	129	383	106	344	86		67000	674	232	179	185	15	M 14	40	9,6	4204-200201-000000

Cone Clamping Elements RLK 133

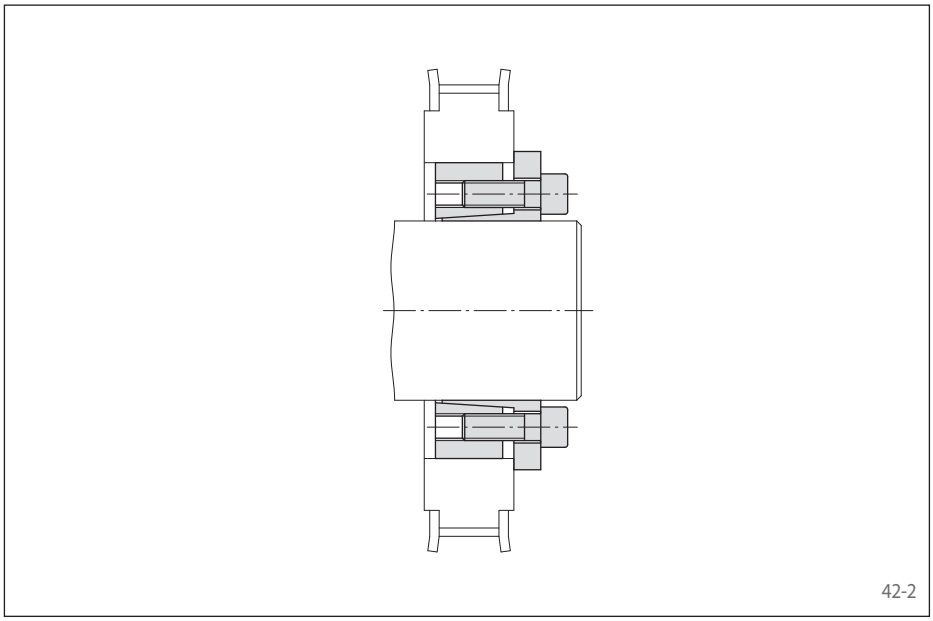
RINGSPANN®

centres the hub to the shaft
short axial width with fixed backstop point



Features

- Centres the shaft to the hub
- Short axial width
- No axial displacement between hub and shaft during clamping procedure due to fixed backstop point
- For shaft diameters between 20 mm and 200 mm



Application example

Backlash free connection of a timing belt pulley to the drive shaft with a Cone Clamping Element RLK 133. Due to the fixed backstop point, the timing belt pulley is not displaced axially during clamping. The Cone Clamping Element also centres the timing belt pulley to the shaft. The compact Cone Clamping Element is a cost-efficient solution especially for applications with low space requirements.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 43 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 133.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

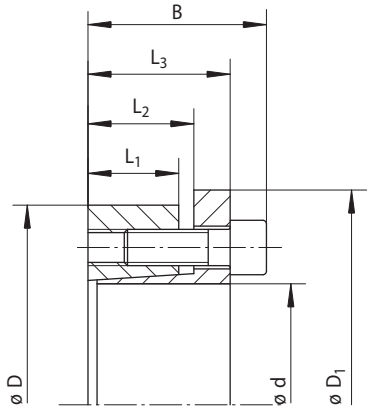
Cone Clamping Element RLK 133 for shaft diameter d = 100 mm:

- RLK 133, size 100 x 145
  Article number 4204-100301-000000

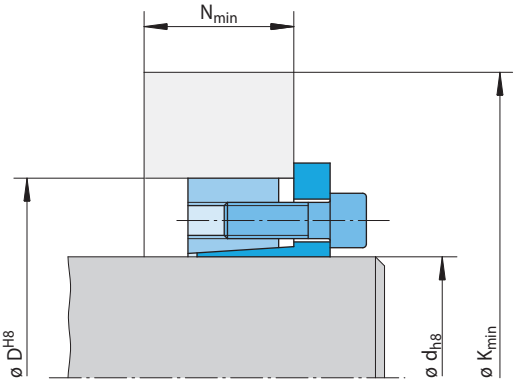
Cone Clamping Elements RLK 133

RINGSPANN®

centres the hub to the shaft
short axial width with fixed backstop point



43-1



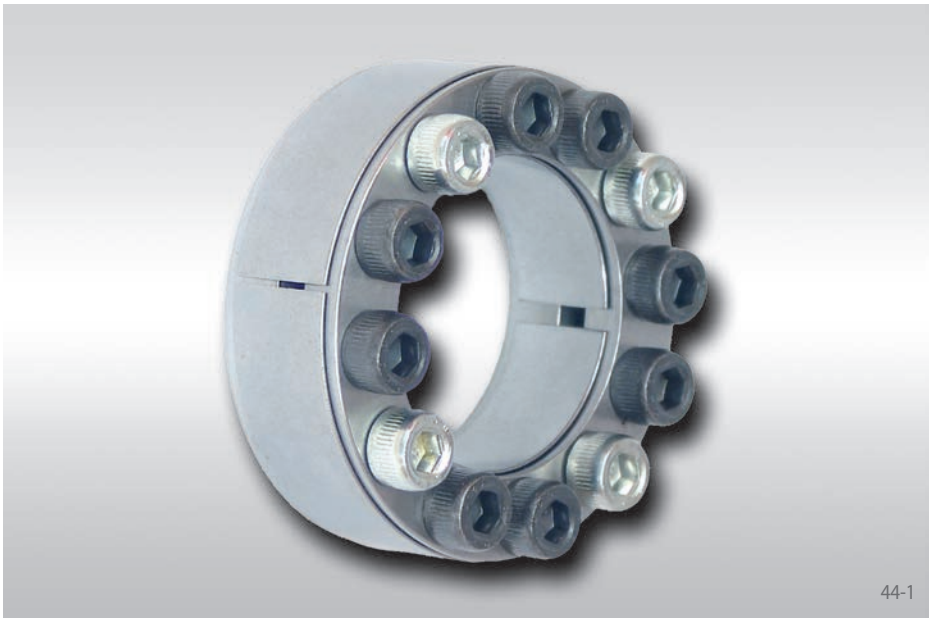
43-2

Dimensions														Technical Data										Article number
							Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size							200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	D_1	B	L_1	L_2	L_3	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	53	34	17	22	28	87	32	69	28	61	24	320	33	290	123	16	6	M 6	20	0,3	4204-020301-000000
22	47	53	34	17	22	28	87	32	69	28	61	24	350	33	264	123	16	6	M 6	20	0,3	4204-022301-000000
24	50	56	34	17	22	28	88	32	71	27	64	24	390	33	242	116	16	6	M 6	20	0,3	4204-024301-000000
25	50	56	34	17	22	28	88	32	71	27	64	24	400	33	232	116	16	6	M 6	20	0,3	4204-025301-000000
28	55	62	34	17	22	28	91	31	75	27	68	24	450	33	207	106	16	6	M 6	20	0,4	4204-028301-000000
30	55	62	34	17	22	28	91	31	75	27	68	24	480	33	193	106	16	6	M 6	20	0,3	4204-030301-000000
32	60	69	34	17	22	28	109	34	87	29	77	26	690	43	242	129	16	8	M 6	20	0,3	4204-032301-000000
35	60	69	34	17	22	28	109	34	87	29	77	26	760	43	221	129	16	8	M 6	20	0,4	4204-035301-000000
38	65	72	34	17	22	28	111	34	91	29	82	26	820	43	204	119	16	8	M 6	20	0,5	4204-038301-000000
40	65	72	34	17	22	28	111	34	91	29	82	26	860	43	193	119	16	8	M 6	20	0,4	4204-040301-000000
42	75	84	41	20	25	33	155	45	120	36	102	32	1 550	76	273	153	37	8	M 8	25	0,7	4204-042301-000000
45	75	84	41	20	25	33	155	45	120	36	102	32	1 700	76	255	153	37	8	M 8	25	0,7	4204-045301-000000
48	80	89	41	20	24	33	156	44	123	36	106	32	1 800	76	239	143	37	8	M 8	25	0,8	4204-048301-000000
50	80	89	41	20	24	33	156	44	123	36	106	32	1 850	76	229	143	37	8	M 8	25	0,8	4204-050301-000000
55	85	91	41	20	24	33	158	43	127	36	111	32	2 050	76	208	135	37	8	M 8	25	0,9	4204-055301-000000
60	90	99	41	20	24	33	160	43	131	35	115	31	2 250	76	191	127	37	8	M 8	25	0,9	4204-060301-000000
65	95	104	41	20	24	33	162	42	135	35	120	31	2 450	76	176	121	37	8	M 8	25	0,9	4204-065301-000000
70	110	119	50	24	29	40	203	53	164	44	143	38	4 100	119	217	138	73	8	M 10	30	1,6	4204-070301-000000
75	115	124	50	24	29	40	205	53	168	43	148	38	4 400	119	203	132	73	8	M 10	30	1,7	4204-075301-000000
80	120	129	50	24	29	40	207	52	172	43	153	38	4 700	119	190	127	73	8	M 10	30	1,9	4204-080301-000000
85	125	134	50	24	29	40	235	58	190	46	166	40	6 300	149	224	152	73	10	M 10	30	2,0	4204-085301-000000
90	130	139	50	24	29	40	237	57	194	46	170	40	6 700	149	211	146	73	10	M 10	30	2,0	4204-090301-000000
95	135	144	50	24	29	40	239	56	198	46	175	40	7 000	149	200	141	73	10	M 10	30	2,3	4204-095301-000000
100	145	154	56	26	31	44	259	61	214	49	188	43	8 700	175	204	140	126	8	M 12	30	2,8	4204-100301-000000
110	155	164	56	26	31	44	264	59	222	49	197	43	9 600	175	185	131	126	8	M 12	30	3,1	4204-110301-000000
120	165	174	56	26	31	44	285	62	238	50	212	44	11 700	197	191	139	126	9	M 12	30	3,2	4204-120301-000000
130	180	189	64	34	39	52	316	74	262	61	232	53	17 000	262	180	130	126	12	M 12	30	4,6	4204-130301-000000
140	190	199	68	34	39	54	326	74	273	61	243	53	18 500	270	172	127	201	9	M 14	40	5,0	4204-140301-000000
150	200	209	68	34	39	54	348	77	291	63	258	55	22 000	300	178	134	201	10	M 14	40	5,2	4204-150301-000000
160	210	219	68	34	39	54	385	84	317	67	278	57	28 500	360	201	153	201	12	M 14	40	5,6	4204-160301-000000
170	225	234	78	44	49	64	373	87	315	73	282	64	30 500	360	146	110	201	12	M 14	40	6,5	4204-170301-000000
180	235	244	78	44	49	64	379	86	323	72	291	64	32 000	360	138	106	201	12	M 14	40	8,5	4204-180301-000000
190	250	259	78	44	49	64	427	94	358	77	319	67	42 500	450	163	124	201	15	M 14	40	9,0	4204-190301-000000
200	260	269	78	44	49	64	433	93	367	77	328	67	44 500	450	155	119	201	15	M 14	40	9,6	4204-200301-000000

Cone Clamping Elements RLK 200

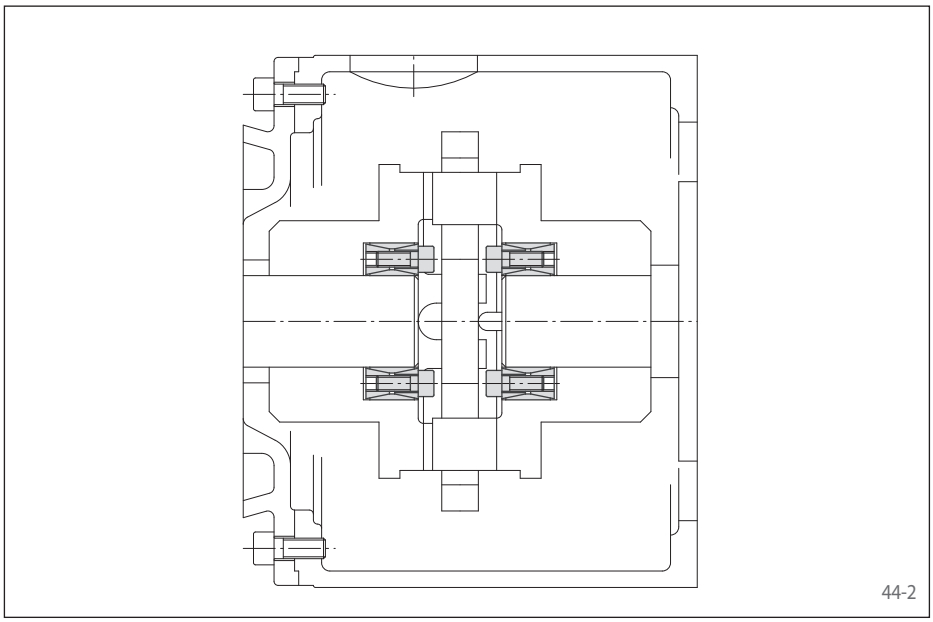
RINGSPANN®

easy to release
compact design



Features

- Easy to release
- Compact design
- No axial displacement between hub and shaft during clamping procedure
- Extended tolerances for hub and shaft
- For shaft diameters between 20 mm and 400 mm



Application example

Backlash free connection of the two hubs of a Flexible Coupling L42 from RINGSPANN with a Cone Clamping Element RLK 200. The Flexible Coupling is situated in the latern of a geared motor driving a roller conveyor.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 45 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h9 for shaft diameter d
- H9 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 200.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

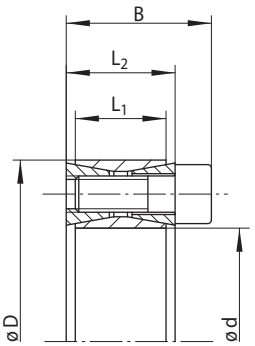
Cone Clamping Element RLK 200 for shaft diameter d = 100 mm:

- RLK 200, size 100 x 145
  Article number 4201-100001-000000

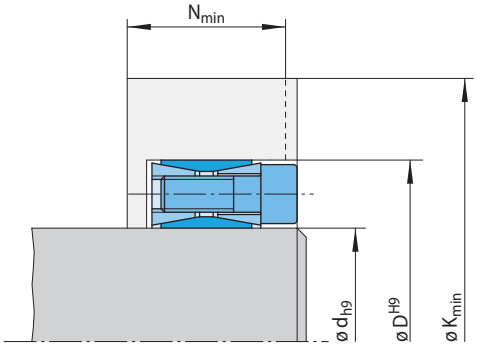
Cone Clamping Elements RLK 200

RINGSPANN®

easy to release
compact design



45-1



45-2

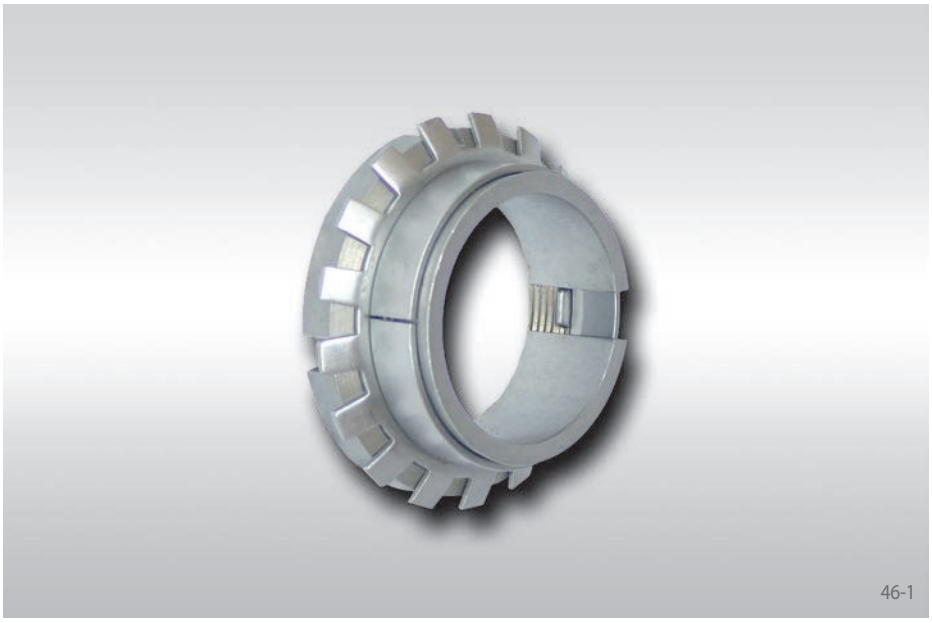
Dimensions											Technical Data									Article number
					Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size					200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
20	47	26	17	20	77	32	66	27	59	23	270	28	247	105	16	8	M 6	18	0,2	4201-020001-000000
22	47	26	17	20	77	32	66	27	59	23	300	28	224	105	16	8	M 6	18	0,2	4201-022001-000000
24	50	26	17	20	79	32	68	26	62	23	330	28	206	99	16	8	M 6	18	0,3	4201-024001-000000
25	50	26	17	20	79	32	68	26	62	23	340	28	198	99	16	8	M 6	18	0,3	4201-025001-000000
28	55	26	17	20	99	37	81	30	72	26	580	42	265	135	16	12	M 6	18	0,3	4201-028001-000000
30	55	26	17	20	99	37	81	30	72	26	620	42	247	135	16	12	M 6	18	0,3	4201-030001-000000
32	60	26	17	20	101	36	85	30	77	26	660	42	231	123	16	12	M 6	18	0,3	4201-032001-000000
35	60	26	17	20	101	36	85	30	77	26	720	42	212	123	16	12	M 6	18	0,3	4201-035001-000000
38	65	26	17	20	117	39	95	32	85	27	980	52	244	142	16	15	M 6	18	0,4	4201-038001-000000
40	65	26	17	20	117	39	95	32	85	27	1 000	52	231	142	16	15	M 6	18	0,4	4201-040001-000000
42	75	32	20	24	138	48	113	39	100	33	1 550	74	268	150	38	12	M 8	22	0,6	4201-042001-000000
45	75	32	20	24	138	48	113	39	100	33	1 650	74	251	150	38	12	M 8	22	0,5	4201-045001-000000
48	80	32	20	24	140	47	117	39	105	33	1 750	74	235	141	38	12	M 8	22	0,6	4201-048001-000000
50	80	32	20	24	140	47	117	39	105	33	1 850	74	225	141	38	12	M 8	22	0,6	4201-050001-000000
55	85	32	20	24	162	51	129	42	115	35	2 500	93	256	166	38	15	M 8	22	0,6	4201-055001-000000
60	90	32	20	24	164	51	133	42	119	35	2 700	93	235	157	38	15	M 8	22	0,7	4201-060001-000000
65	95	32	20	24	166	50	137	41	124	35	3 000	93	217	148	38	15	M 8	22	0,8	4201-065001-000000
70	110	38	24	28	211	63	167	52	148	43	5 200	149	271	172	75	15	M 10	25	1,3	4201-070001-000000
75	115	38	24	28	213	63	171	52	153	43	5 500	149	253	165	75	15	M 10	25	1,2	4201-075001-000000
80	120	38	24	28	215	62	175	52	157	43	5 900	149	237	158	75	15	M 10	25	1,4	4201-080001-000000
85	125	38	24	28	218	61	179	51	162	43	6 300	149	223	152	75	15	M 10	25	1,4	4201-085001-000000
90	130	38	24	28	220	61	184	51	167	43	6 600	149	211	146	75	15	M 10	25	1,5	4201-090001-000000
95	135	38	24	28	244	65	199	54	177	45	8 400	179	239	168	75	18	M 10	25	1,6	4201-095001-000000
100	145	44	26	32	263	74	214	61	192	50	10 900	218	255	176	130	15	M 12	30	2,2	4201-100001-000000
110	155	44	26	32	268	72	222	60	202	50	12 000	218	231	164	130	15	M 12	30	2,3	4201-110001-000000
120	165	44	26	32	282	73	235	61	213	50	13 500	233	226	165	130	16	M 12	30	2,4	4201-120001-000000
130	180	50	34	38	311	83	257	69	231	60	18 500	291	200	144	130	20	M 12	35	3,5	4201-130001-000000
140	190	50	34	38	331	85	273	71	244	61	22 000	320	204	150	130	22	M 12	35	3,8	4201-140001-000000
150	200	50	34	38	351	88	290	73	258	63	26 000	350	208	156	130	24	M 12	35	4,0	4201-150001-000000
160	210	50	34	38	371	90	306	74	271	65	30 000	379	211	161	130	26	M 12	35	4,4	4201-160001-000000
170	225	58	38	44	391	100	323	83	290	71	36 000	424	199	151	200	22	M 14	40	5,7	4201-170001-000000
180	235	58	38	44	414	103	341	85	304	73	41 500	463	205	157	200	24	M 14	40	6,0	4201-180001-000000
190	250	66	46	52	438	113	361	94	321	82	51 000	540	188	143	200	28	M 14	45	8,0	4201-190001-000000
200	260	66	46	52	459	116	378	96	334	83	57 500	579	191	147	200	30	M 14	45	8,2	4201-200001-000000
220	285	72	50	56	500	126	412	104	366	91	74 000	674	186	144	300	26	M 16	50	11,0	4201-220001-000000
240	305	72	50	56	547	133	450	108	395	95	93 000	778	197	155	300	30	M 16	50	12,2	4201-240001-000000
260	325	72	50	56	593	139	486	112	426	97	114 500	882	206	165	300	34	M 16	50	13,2	4201-260001-000000
280	355	84	60	66	624	151	515	124	455	109	139 000	994	180	142	410	32	M 18	60	19,2	4201-280001-000000
300	375	84	60	66	671	158	553	129	487	112	167 500	1 119	190	152	410	36	M 18	60	20,5	4201-300001-000000
320	405	98	72	78	746	183	607	149	530	129	235 000	1 469	193	153	590	36	M 20	70	29,6	4201-320001-000000
340	425	98	72	78	755	181	622	147	549	129	249 500	1 469	182	146	590	36	M 20	70	31,1	4201-340001-000000
360	455	112	84	90	827	205	675	167	592	146	322 000	1 791	180	143	790	36	M 22	80	42,2	4201-360001-000000
380	475	112	84	90	837	203	691	166	610	146	340 000	1 791	171	137	790	36	M 22	80	44,0	4201-380001-000000
400	495	112	84	90	848	200	708	165	629	146	358 000	1 791	162	131	790	36	M 22	80	46,0	4201-400001-000000

Larger elements available on request.

Cone Clamping Elements RLK 250

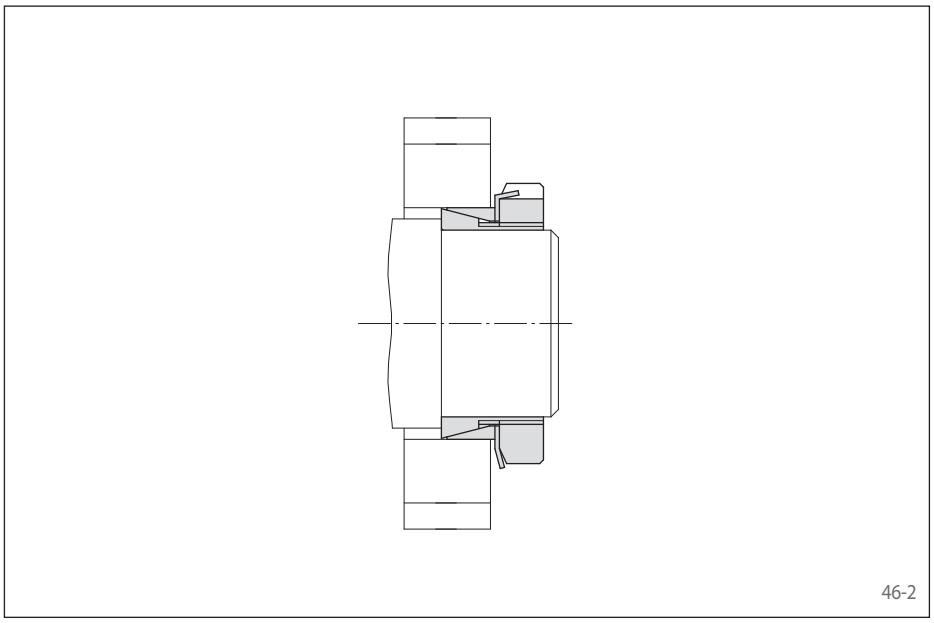
centres the hub to the shaft
quick assembly, easy to release

RINGSPANN®


46-1

Features

- Centres the hub to the shaft
- Radial flat height is particularly suitable for small hub outer diameters
- Quick assembly by central groove nut
- Easy to release
- For shaft diameters between 15 mm and 70 mm


46-2

Application example

Backlash free connection of a drive wheel to a shaft with a Cone Clamping Element RLK 250. The central groove nut leads to a uniform displacement of the cone ring during clamping and thus achieves a centring that is sufficient for lower requirements. The central groove nut and the self-releasing cone ensure quick disassembly. Thus, a worn drive wheel can be replaced with the shortest of downtimes.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 47 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 250.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

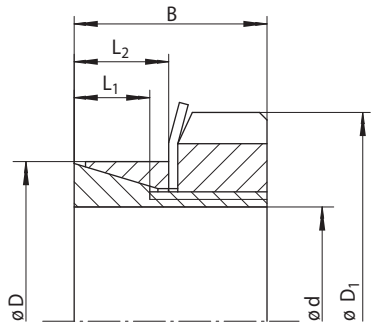
Cone Clamping Element RLK 250 for shaft diameter d = 50 mm:

- RLK 250, size 50 x 62
  Article number 4202-050001-000000

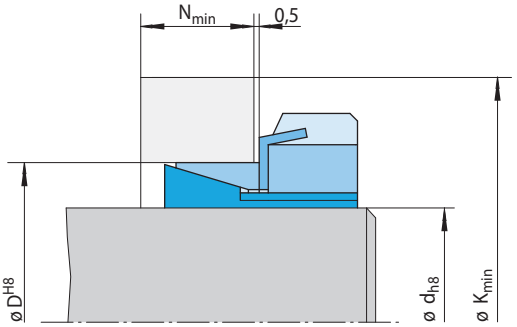
Cone Clamping Elements RLK 250

RINGSPANN®

centres the hub to the shaft
quick assembly, easy to release



47-1



47-2

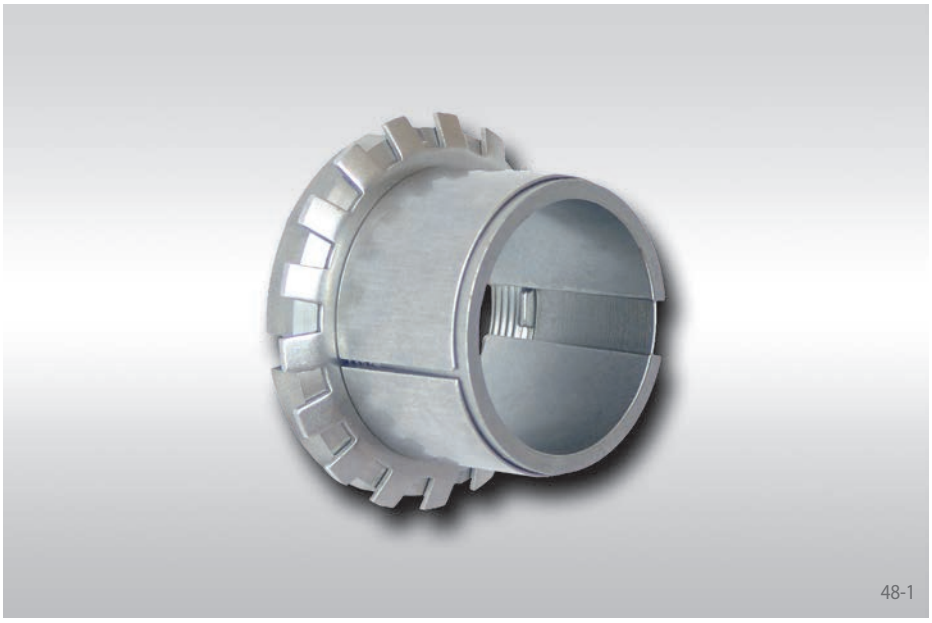
Dimensions													Technical Data							Article number
						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Groove nut		Weight	
Size						200		320		500				Shaft	Hub	Tightening torque	Size		
d	D	D_1	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm		kg	
15	25	32	16,5	6,5	9,5	39	13	34	11	31	10	38	5	159	95	48	KM 4	0,050	4202-015001-000000
16	25	32	16,5	6,5	9,5	40	13	34	11	31	10	42	5	160	102	50	KM 4	0,048	4202-016001-000000
19	30	38	18,0	6,5	10,0	46	14	40	12	37	10	60	6	160	101	74	KM 5	0,080	4202-019001-000000
20	30	38	18,0	6,5	10,0	47	14	41	12	37	10	65	6	160	106	78	KM 5	0,070	4202-020001-000000
24	35	45	18,0	6,5	10,0	55	15	47	13	43	11	95	8	160	109	110	KM 6	0,100	4202-024001-000000
25	35	45	18,0	6,5	10,0	55	15	47	13	44	11	105	8	160	114	120	KM 6	0,090	4202-025001-000000
30	40	52	19,5	7,0	10,5	64	16	55	14	50	12	160	10	160	120	170	KM 7	0,130	4202-030001-000000
35	45	58	21,5	8,0	10,5	76	18	64	15	57	13	250	14	160	124	250	KM 8	0,170	4202-035001-000000
36	45	58	21,5	8,0	10,5	77	18	65	15	58	13	260	14	160	128	260	KM 8	0,150	4202-036001-000000
40	52	65	24,5	10,0	12,5	88	19	74	16	67	14	350	17	138	106	460	KM 9	0,240	4202-040001-000000
45	57	70	25,5	10,0	12,5	91	21	78	17	70	15	420	18	132	104	550	KM 10	0,270	4202-045001-000000
48	62	75	25,5	10,0	12,5	100	22	85	18	77	16	500	22	144	112	700	KM 11	0,320	4202-048001-000000
50	62	75	25,5	10,0	12,5	100	22	85	18	77	16	560	22	138	112	700	KM 11	0,280	4202-050001-000000
55	68	80	27,5	12,0	15,0	99	22	88	20	81	18	600	21	103	83	770	KM 12	0,360	4202-055001-000000
56	68	80	27,5	12,0	15,0	99	22	88	20	81	18	610	21	101	83	770	KM 12	0,340	4202-056001-000000
60	73	85	28,5	12,0	16,5	104	24	92	21	86	19	710	24	102	83	880	KM 13	0,390	4202-060001-000000
63	79	92	30,5	14,0	17,0	114	25	101	22	93	20	870	28	97	77	1 100	KM 14	0,560	4202-063001-000000
65	79	92	30,5	14,0	17,0	114	25	101	22	93	20	900	28	94	77	1 100	KM 14	0,520	4202-065001-000000
70	84	98	31,5	14,0	17,0	121	26	107	22	99	20	1 050	30	95	79	1 250	KM 15	0,600	4202-070001-000000

If the hub cannot be freely moved to the left, e.g. due to a shaft shoulder, the values for M, F, P_W and P_N are reduced by 37%. In this case, the required hub outer diameter K_{min} and the required hub width N_{min} may be lower than indicated.

Cone Clamping Elements RLK 250 L

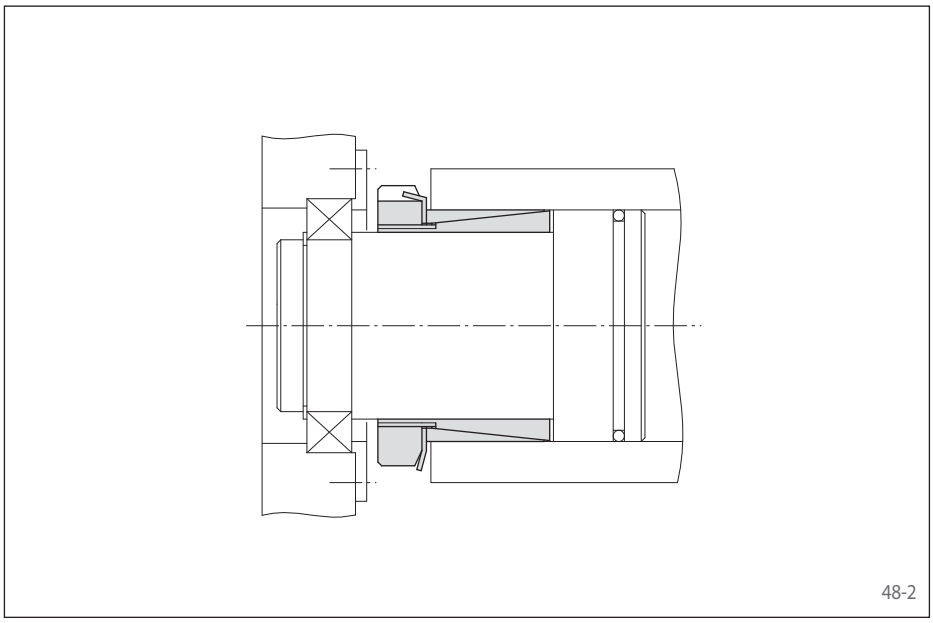
RINGSPANN®

centres the hub to the shaft
quick assembly



Features

- Centres the hub to the shaft
- Radial flat height is particularly suitable for small hub outer diameters
- Quick assembly by central groove nut
- For shaft diameters between 15 mm and 70 mm



Application example

Backlash free connection of a hollow shaft with a Cone Clamping Element RLK 250 L. The Cone Clamping Element centres the hollow shaft on the shaft. Due to the flat radial height of the Cone Clamping Element, the hollow shaft can be designed thin walled.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 49 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 250 L.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

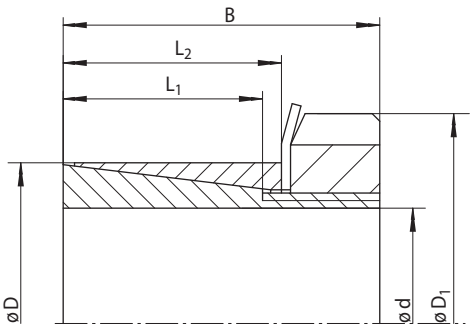
Cone Clamping Element RLK 250 L for shaft diameter d = 50 mm:

- RLK 250 L, size 50 x 60
  Article number 4202-050002-000000

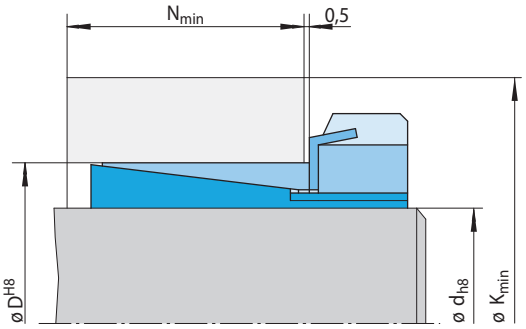
Cone Clamping Elements RLK 250 L

RINGSPANN®

centres the hub to the shaft
quick assembly



49-1



49-2

Dimensions												Technical Data							Article number
						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Groove nut		Weight	
Size						200		320		500				Shaft	Hub	Tightening torque	Size		
d	D	D_1	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S			
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm		kg	
15	25	32	29	17	23	40	25	34	23	30	23	74	9,8	120	72	53	KM 4	0,08	4202-015001-A00000
16	25	32	29	17	23	41	25	34	23	31	23	80	10	120	76	56	KM 4	0,07	4202-016001-A00000
17	25	38	31	18	24	42	27	35	24	31	24	100	11	120	81	72	KM 5	0,13	4202-017001-A00000
18	30	38	31	18	24	47	27	40	24	36	24	110	12	120	72	83	KM 5	0,12	4202-018002-000000
19	30	38	31	18	24	48	27	41	24	37	24	120	12	120	76	90	KM 5	0,12	4202-019001-A00000
20	30	38	31	18	24	49	28	41	24	37	24	130	13	120	80	100	KM 5	0,11	4202-020001-A00000
22	35	45	35	21	26	57	30	47	27	43	26	180	16	120	75	130	KM 6	0,18	4202-022001-A00000
24	35	45	35	21	26	60	31	48	28	43	26	230	19	119	82	160	KM 6	0,16	4202-024001-A00000
25	35	45	35	21	26	61	31	49	28	44	26	250	16	120	85	160	KM 6	0,15	4202-025001-A00000
28	40	52	35	22	27	69	33	55	29	50	27	330	23	120	84	220	KM 7	0,24	4202-028001-A00000
30	40	52	35	22	27	72	34	57	30	50	27	380	20	120	90	230	KM 7	0,21	4202-030004-000000
35	45	58	42	28	31,5	90	39	68	34	58	32	460	26	120	93	320	KM 8	0,26	4202-035001-A00000
40	50	65	44	28	34	99	40	75	34	65	34	640	32	120	96	440	KM 9	0,33	4202-040002-000000
45	55	70	45	28	34	105	41	82	35	71	34	760	33	120	98	550	KM 10	0,39	4202-045001-A00000
50	60	75	46	28	34	117	42	91	36	78	34	930	37	120	100	660	KM 11	0,40	4202-050002-000000
55	65	80	47	28	34	118	41	94	35	82	34	1100	40	120	97	770	KM 12	0,44	4202-055002-000000
60	70	85	52	28	38,5	125	42	101	39	88	39	1500	50	120	97	890	KM 13	0,55	4202-060001-A00000

If the hub cannot be freely moved to the left, e.g. due to a shaft shoulder, the values for M, F, P_W and P_N are reduced by 37%. In this case, the required hub outer diameter K_{min} and the required hub width N_{min} may be lower than indicated.

Cone Clamping Elements RLK 300

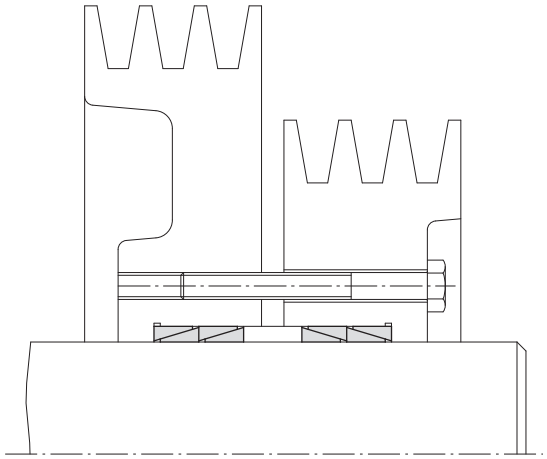
for individual clamping connections

RINGSPANN®

50-1

Features

- For individual clamping connections
- Compact design
- For shaft diameters between 10 mm and 200 mm



50-2

Application example

Backlash free connection of two V-belt pulleys with two Cone Clamping Elements RLK 300 each. In this assembly, the screw force is used on both sides. By this, both packages with two Cone Clamping Elements each are charged with the preload force. Due to the double arrangement of the Cone Clamping Elements, the transmissible torque is increased. Because of the recessed hub, separate pressure flanges are not required. This makes the solution very cost-effective.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on pages 52 through 53 are subject to the following tolerances, surface characteristics, materials and preload force requirement. Please contact us in the case of deviations.

Tolerances

d > mm	d ≤ mm	Hub bore ISO	Shaft ISO
10	40	H7	h6
40	200	H8	h8

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hollow shaft $R_z = 4^{-10}$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Preload force

The preload force is achieved by the clamping screws provided by the customer. The preload force E_1 or E_2 stated in the table may be increased or decreased according to the technical notes on page 64.

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 300.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

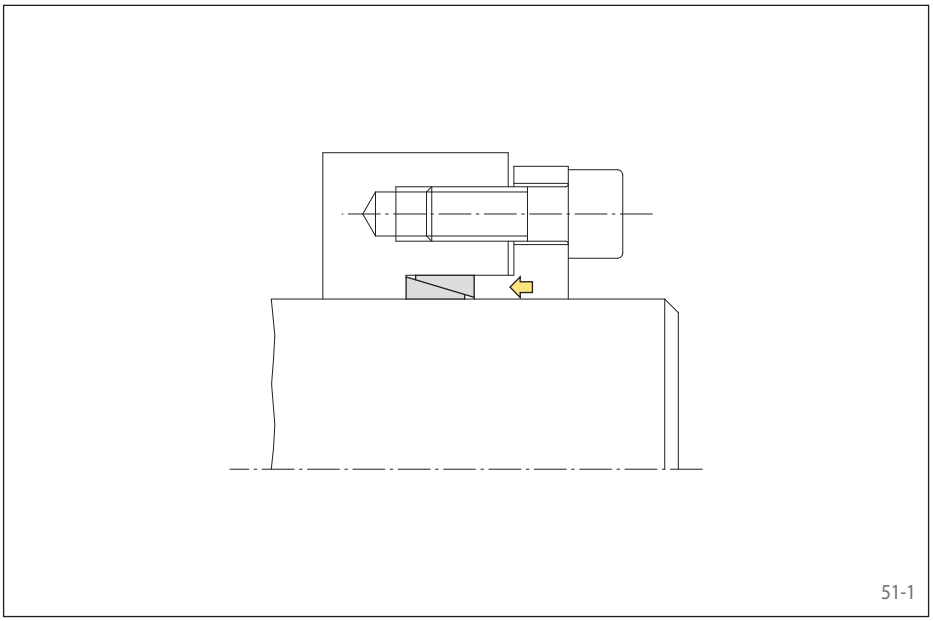
Example for ordering

Cone Clamping Element RLK 300 for shaft diameter d = 50 mm:

- RLK 300, size 50 x 57
  Article number 4203-050001-000000

Installation case 1

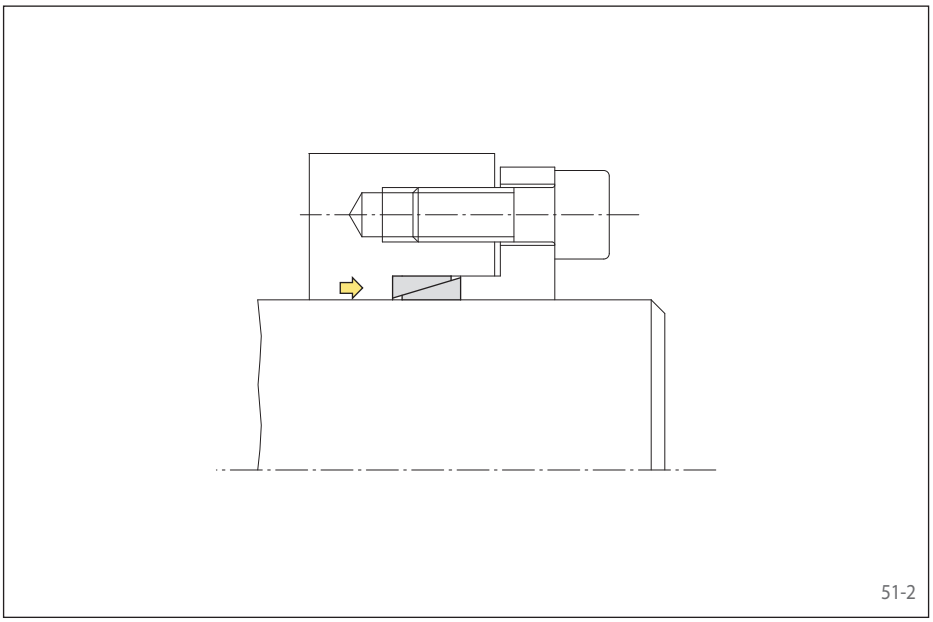
The adjusted axial position of the hub is not changed during clamping. The preload force E_1 must be provided for.



51-1

Installation case 2

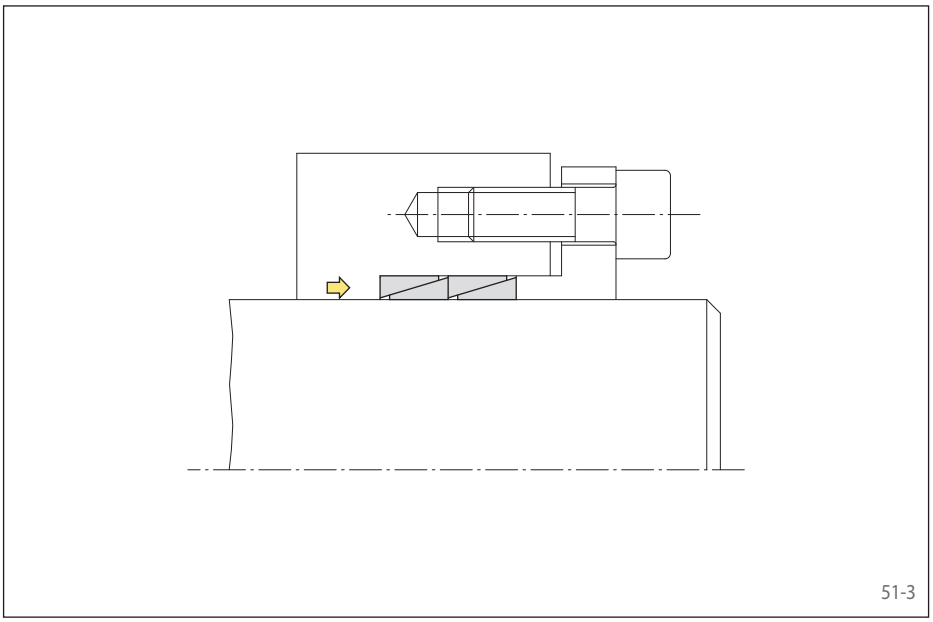
During clamping, the hub is displaced slightly to the right compared to the shaft. The preload force E_2 must be provided for. The connection can easily be released when the Cone Clamping Element is assembled according to figure 51-2.



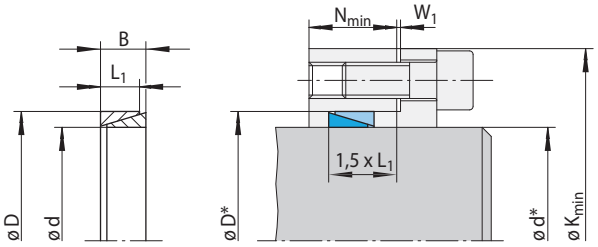
51-2

Double Arrangement

A double arrangement of two Cone Clamping Elements must be built according to installation case 2. The transmissible torque or axial force are not doubled compared to the values for M or F listed in the tables but are increased by 55%. The preload force E_1 must be provided for. The hub stress σ_V must be verified (page 65).



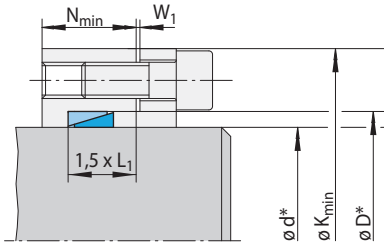
51-3



52-1

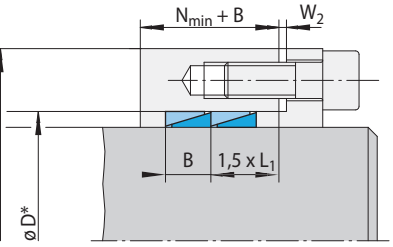
Installation case 1

52-2



Installation case 2

52-3



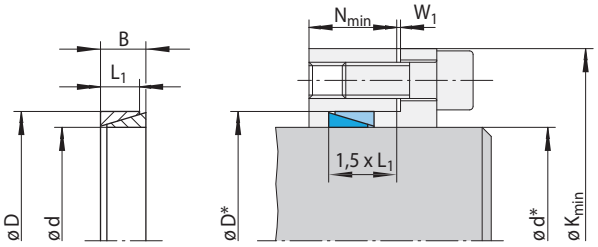
Double Arrangement

52-4

For notes on assembly cases 1 and 2 and double arrangement, see page 51.

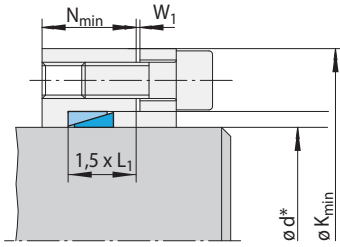
*For tolerances see page 50.

Dimensions												Technical Data							Article number
						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Preload force		Weight	
Size						200		320		500				Shaft	Hub				
d	D	B	L_1	W_1	W_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	E_1	E_2		
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	kN	kN	kg	
10	13	4,5	3,7	3	3	19	7,4	17	7,0	16	6,5	7,3	1,4	120	92	10,1	8,4	0,002	4203-010001-000000
12	15	4,5	3,7	3	3	22	7,4	19	7,0	18	6,5	10,5	1,7	120	96	11,6	9,5	0,002	4203-012001-000000
13	16	4,5	3,7	3	3	23	7,4	21	7,0	19	6,5	12,3	1,8	120	98	12,4	10,1	0,002	4203-013001-000000
14	18	6,3	5,3	3	4	26	10,6	23	10,1	22	9,3	20,4	2,9	120	93	20,0	16,5	0,005	4203-014001-000000
15	19	6,3	5,3	3	4	28	10,6	25	10,1	23	9,3	23,5	3,1	120	95	21,1	17,4	0,005	4203-015001-000000
16	20	6,3	5,3	3	4	29	10,6	26	10,1	24	9,3	26,0	3,3	120	96	22,2	18,2	0,005	4203-016001-000000
17	21	6,3	5,3	3	4	31	10,6	27	10,1	25	9,3	30,0	3,5	120	97	23,3	19,1	0,006	4203-017001-000000
18	22	6,3	5,3	3	4	32	10,6	28	10,1	26	9,3	33,0	3,7	120	98	24,4	19,9	0,006	4203-018001-000000
19	24	6,3	5,3	3	4	34	10,6	31	10,1	29	9,3	37,7	3,9	120	95	26,7	21,9	0,007	4203-019001-000000
20	25	6,3	5,3	3	4	36	10,6	32	10,1	30	9,3	41,7	4,1	120	96	27,7	22,8	0,008	4203-020001-000000
22	26	6,3	5,3	3	4	38	10,6	33	10,1	31	9,3	50,0	4,5	120	102	28,8	23,4	0,008	4203-022001-000000
24	28	6,3	5,3	3	4	40	10,6	36	10,1	33	9,3	60,1	5,0	120	103	31,0	25,1	0,008	4203-024001-000000
25	30	6,3	5,3	3	4	43	10,6	38	10,1	35	9,3	65,2	5,2	120	100	33,2	27,1	0,009	4203-025001-000000
28	32	6,3	5,3	3	4	46	10,6	41	10,1	38	9,3	81,8	5,8	120	105	35,4	28,6	0,010	4203-028001-000000
30	35	6,3	5,3	3	4	49	10,6	44	10,1	41	9,3	93,9	6,2	120	103	38,7	31,4	0,010	4203-030001-000000
32	36	6,3	5,3	3	4	51	10,6	45	10,1	42	9,3	107	6,6	120	107	39,8	32,0	0,012	4203-032001-000000
35	40	7	6,0	3	4	56	12,0	50	11,4	47	10,5	145	8,2	120	105	50,0	40,4	0,017	4203-035001-000000
36	42	7	6,0	4	5	58	12,0	52	11,4	49	10,5	153	8,5	120	103	52,6	42,7	0,020	4203-036001-000000
38	44	7	6,0	4	5	61	12,0	55	11,4	51	10,5	171	8,9	120	104	55,1	44,6	0,020	4203-038001-000000
40	45	8	6,6	4	5	64	13,2	57	12,5	53	11,6	208	10,3	120	107	61,9	49,9	0,020	4203-040001-000000
42	48	8	6,6	4	5	67	13,2	60	12,5	56	11,6	229	10,9	120	105	66,1	53,4	0,028	4203-042001-000000
45	52	10	8,6	4	5	73	17,2	65	16,3	61	15,1	343	15,2	120	104	93,3	75,5	0,042	4203-045001-000000
48	55	10	8,6	4	5	77	17,2	69	16,3	65	15,1	390	16,2	120	105	98,6	79,7	0,045	4203-048001-000000
50	57	10	8,6	4	5	80	17,2	71	16,3	67	15,1	423	16,9	120	105	102	82,6	0,047	4203-050001-000000
55	62	10	8,6	4	5	86	17,2	77	16,3	72	15,1	512	18,6	120	106	111	89,6	0,050	4203-055001-000000
60	68	12	10,4	4	5	95	20,8	85	19,8	80	18,2	737	24,5	120	106	148	119	0,072	4203-060001-000000
65	73	12	10,4	4	5	102	20,8	91	19,8	85	18,2	865	26,6	120	107	158	128	0,079	4203-065001-000000
70	79	14	12,2	4	5	111	24,4	99	23,2	93	21,4	1176	33,6	120	106	201	162	0,111	4203-070001-000000
75	84	14	12,2	4	5	117	24,4	105	23,2	98	21,4	1351	36,0	120	107	214	172	0,120	4203-075001-000000
80	91	17	15,0	5	6	128	30,0	114	28,5	107	26,3	1889	47,2	120	105	285	230	0,190	4203-080001-000000
85	96	17	15,0	5	6	134	30,0	120	28,5	112	26,3	2133	50,1	120	106	300	242	0,200	4203-085001-000000
90	101	17	15,0	5	6	141	30,0	126	28,5	118	26,3	2391	53,1	120	107	316	254	0,220	4203-090001-000000
95	106	17	15,0	5	6	147	30,0	132	28,5	124	26,3	2664	56,0	120	108	332	267	0,230	4203-095001-000000
100	114	21	18,7	5	6	159	37,4	142	35,5	133	32,7	3680	73,6	120	105	445	359	0,380	4203-100001-000000

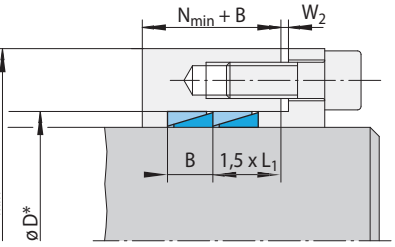


53-1

Installation case 1 53-2



Installation case 2 53-3



Double Arrangement 53-4

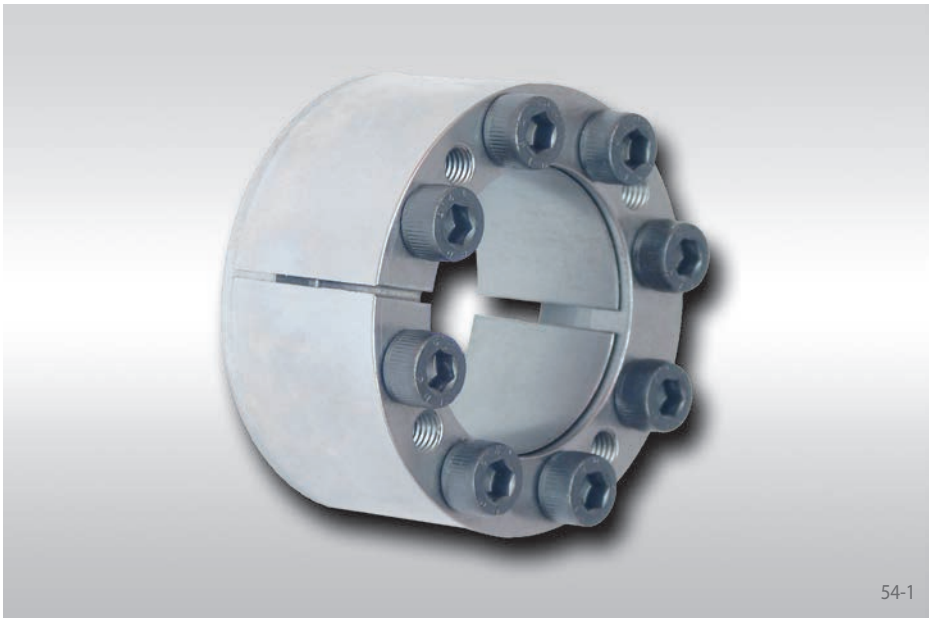
For notes on assembly cases 1 and 2 and double arrangement, see page 51.

*For tolerances see page 50.

Dimensions												Technical Data							Article number
Size						Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Preload force		Weight	
						200		320		500				Shaft	Hub				
d	D	B	L_1	W_1	W_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	E_1	E_2		
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	kN	kN	kg	
110	124	21	18,7	5	6	172	37,4	154	35,5	145	32,7	4453	80,9	120	106	483	389	0,410	4203-110001-000000
120	134	21	18,7	5	6	185	37,4	166	35,5	156	32,7	5299	88,3	120	107	516	415	0,452	4203-120001-000000
130	148	28	25,3	6	7	205	50,6	184	48,1	173	44,3	8414	129	120	105	762	616	0,847	4203-130001-000000
140	158	28	25,3	6	7	218	50,6	196	48,1	184	44,3	9758	139	120	106	808	652	0,910	4203-140001-000000
150	168	28	25,3	6	7	231	50,6	207	48,1	195	44,3	11202	149	120	107	855	689	0,967	4203-150001-000000
160	178	28	25,3	6	7	243	50,6	219	48,1	206	44,3	12746	159	120	108	902	726	1,020	4203-160001-000000
170	191	33	30,0	7	8	262	60,0	236	57,0	222	52,5	17062	200	120	107	1138	917	1,500	4203-170001-000000
180	201	33	30,0	7	8	274	60,0	247	57,0	233	52,5	19128	212	120	107	1195	962	1,580	4203-180001-000000
190	211	33	30,0	7	9	287	60,0	259	57,0	244	52,5	21312	224	120	108	1252	1007	1,690	4203-190001-000000
200	224	38	34,8	7	9	305	69,6	276	66,1	260	60,9	27393	273	120	107	1530	1233	2,320	4203-200001-000000

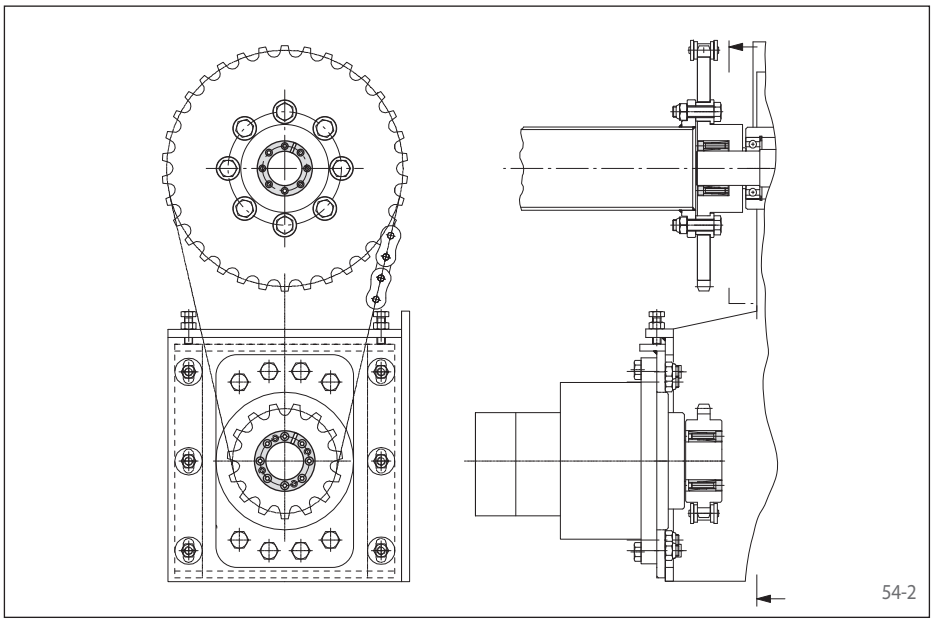
Cone Clamping Elements RLK 350

centres the hub to the shaft for small shaft diameters



Features

- Centres the hub to the shaft
- For shaft diameters between 5 mm and 50 mm



Application example

Backlash free connection of sprocket wheels to shafts in the drive of an industrial door with Cone Clamping Elements RLK 350. The Cone Clamping Elements centre the sprocket wheels on the shaft. The sprocket wheels can be easily aligned in axial and circumferential directions during assembly.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 55 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

If the hub cannot be freely moved to the left, e.g. due to a shaft shoulder, the values for M, F, P_W and P_N are reduced by 37%. K_{min} can be decreased. See the technical notes on page 65.

Please request our installation and operating instructions for Cone Clamping Elements RLK 350.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

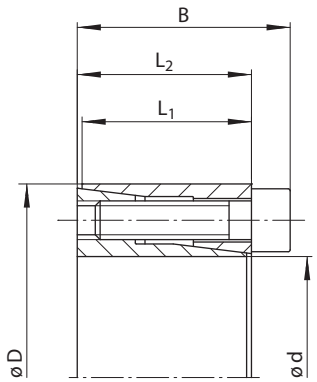
Cone Clamping Element RLK 350 for shaft diameter d = 50 mm:

- RLK 350, size 50 x 80
  Article number 4208-050001-000000

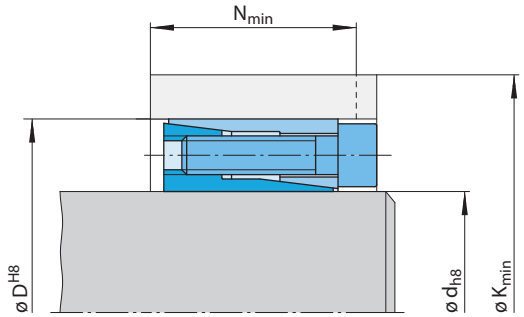
Cone Clamping Elements RLK 350

RINGSPANN®

centres the hub to the shaft
for small shaft diameters



55-1



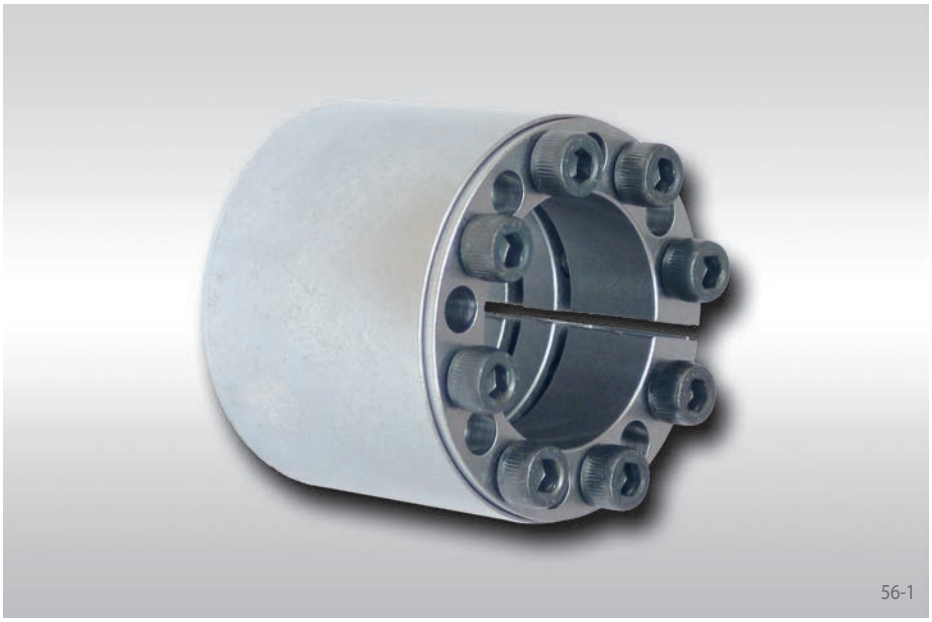
55-2

Dimensions											Technical Data									Article number
					Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size					200		320		500				Shaft	Hub	Tightening torque	Num-ber	Size	Length		
d	D	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
5	16	13,5	10	11	22	14	20	13	19	12	6,5	2,6	166	52	1,0	3	M 2,5	10	0,010	4208-005001-000000
6	16	13,5	10	11	22	14	20	13	19	12	7,8	2,6	139	52	1,0	3	M 2,5	10	0,012	4208-006001-000000
6,35	16	13,5	10	11	22	14	20	13	19	12	8,2	2,6	131	52	1,0	3	M 2,5	10	0,012	4208-006002-000000
7	17	13,5	10,5	11	23	14	21	13	20	12	9,1	2,6	113	47	1,0	3	M 2,5	10	0,013	4208-007001-000000
8	18	13,5	10,5	11	24	14	22	13	21	12	10	2,6	99	44	1,0	3	M 2,5	10	0,015	4208-008001-000000
9	20	15,5	12,5	13	27	16	24	15	23	14	15	3,4	99	44	1,0	4	M 2,5	12	0,020	4208-009001-000000
9,53	20	15,5	12,5	13	27	16	24	15	23	14	15	3,0	89	55	1,2	4	M 2,5	12	0,019	4208-009002-000000
10	20	15,5	12,5	13	27	16	24	15	23	14	17	3,4	89	44	1,0	4	M 2,5	12	0,019	4208-010001-000000
11	22	15,5	12,5	13	28	16	26	15	25	14	19	3,4	81	40	1,0	4	M 2,5	12	0,024	4208-011001-000000
12	22	15,5	12,5	13	28	16	26	15	25	14	20	3,4	74	40	1,0	4	M 2,5	12	0,022	4208-012001-000000
14	26	20	16,5	17	33	20	31	19	29	18	36	5,2	69	37	1,8	4	M 3	16	0,039	4208-014001-000000
15	28	20	16,5	17	35	20	33	19	31	18	39	5,2	64	34	1,8	4	M 3	16	0,044	4208-015001-000000
16	32	21	16,5	17	44	23	40	21	37	19	75	9,4	107	53	4,5	4	M 4	16	0,067	4208-016001-000000
17	35	25	20,5	21	45	26	41	24	39	23	80	9,4	81	39	4,5	4	M 4	20	0,090	4208-017001-000000
18	35	25	20,5	21	45	26	41	24	39	23	84	9,4	76	39	4,5	4	M 4	20	0,087	4208-018001-000000
19	35	25	20,5	21	45	26	41	24	39	23	89	9,4	72	39	4,5	4	M 4	20	0,083	4208-019001-000000
20	38	26	20,5	21	54	29	48	26	44	24	150	15	114	60	9,0	4	M 5	20	0,100	4208-020001-000000
22	40	26	20,5	21	56	29	50	26	46	24	160	15	104	57	9,0	4	M 5	20	0,110	4208-022001-000000
24	47	32	25	26	65	34	58	31	54	29	260	22	113	58	16	4	M 6	25	0,200	4208-024001-000000
25	47	32	25	26	65	34	58	31	54	29	270	22	108	58	16	4	M 6	25	0,190	4208-025001-000000
28	50	32	25	26	77	39	67	34	61	31	460	34	145	81	16	6	M 6	25	0,180	4208-028001-000000
30	55	32	25	26	81	38	71	33	65	30	500	34	135	74	16	6	M 6	25	0,220	4208-030001-000000
32	55	32	25	26	81	38	71	33	65	30	530	34	127	74	16	6	M 6	25	0,270	4208-032001-000000
35	60	37	30	31	90	45	78	39	72	36	580	34	97	56	16	6	M 6	30	0,250	4208-035001-000000
38	65	37	30	31	94	44	83	39	77	36	840	45	119	69	16	8	M 6	30	0,360	4208-038001-000000
40	65	37	30	31	94	44	83	39	77	36	890	45	113	69	16	8	M 6	30	0,430	4208-040001-000000
45	75	44	35	36	109	52	96	46	89	42	1 750	78	150	90	37	8	M 8	35	0,630	4208-045001-000000
50	80	44	35	36	127	56	108	49	98	44	1 900	78	135	84	37	8	M 8	35	0,700	4208-050001-000000

Cone Clamping Elements RLK 402

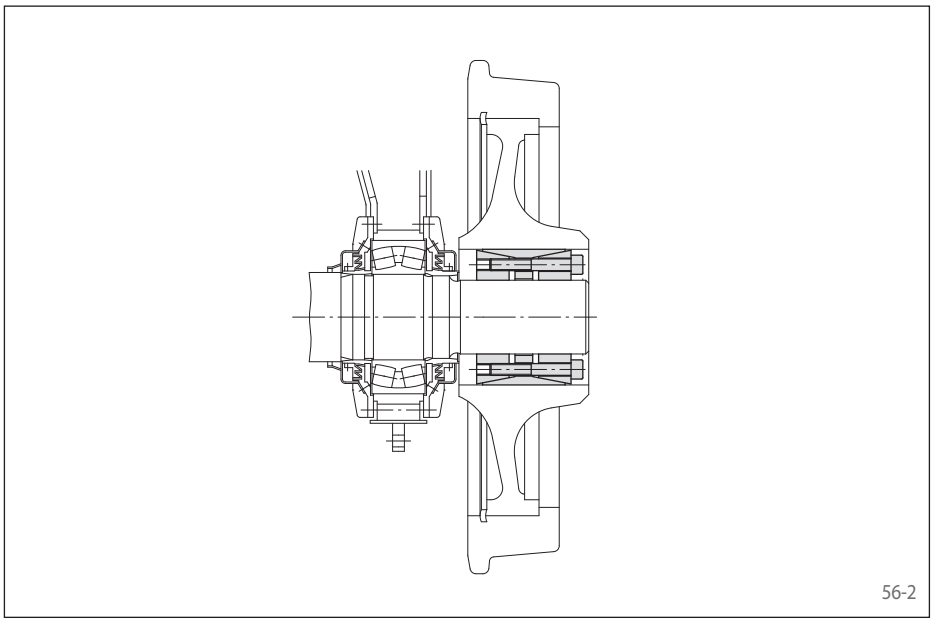
centres the hub to the shaft
highest transmissible torque

RINGSPANN®


56-1

Features

- Centres the hub to the shaft
- Highest transmissible torque
- For heavy duty applications
- No axial displacement between hub and shaft during clamping procedure
- For shaft diameters between 25 mm and 300 mm


56-2

Application example

Backlash free connection of rail wheels of a crane with Cone Clamping Elements RLK 402. The Cone Clamping Elements centre the rail wheels on the shaft. Because there is no axial displacement during clamping, the axial position of the wheel is maintained on the shaft.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 57 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 402.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

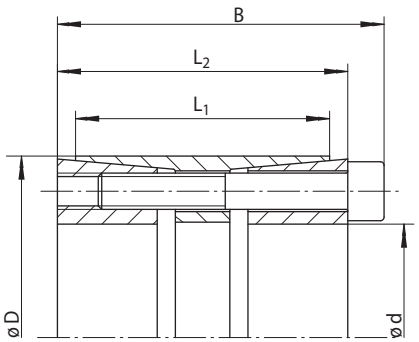
Cone Clamping Element RLK 402 for shaft diameter d = 100 mm:

- RLK 402, size 100 x 145
  Article number 4205-100201-000000

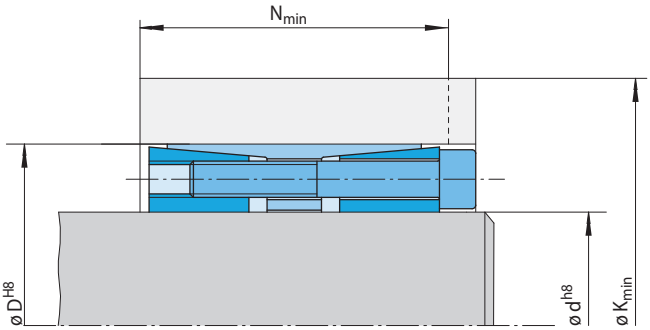
Cone Clamping Elements RLK 402

RINGSPANN®

centres the hub to the shaft
highest transmissible torque



57-1



57-2

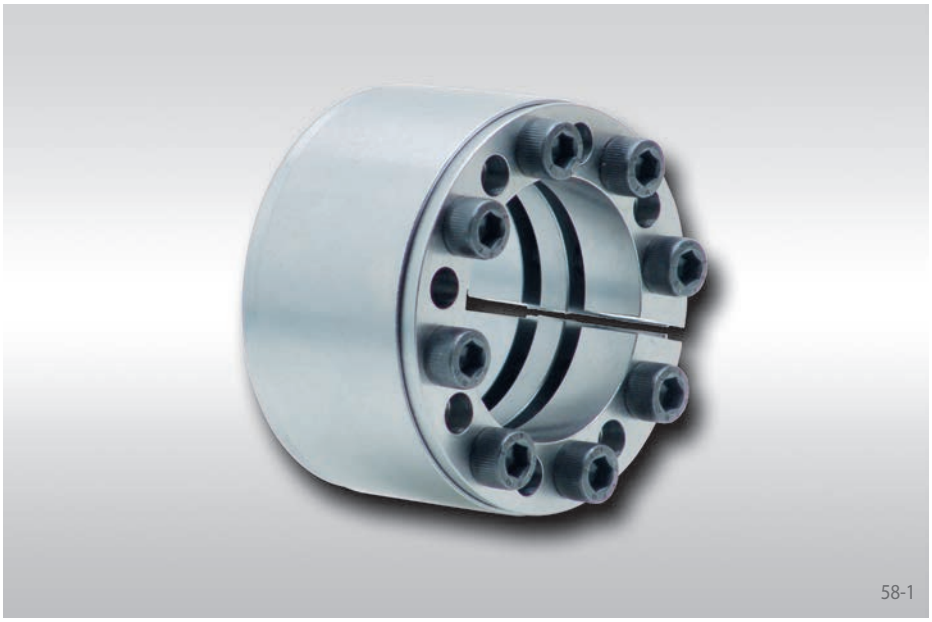
Dimensions											Technical Data									Article number
					Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size					200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
25	50	51	41	45	88	60	71	52	63	48	760	62	233	117	16	6	M 6	35	0,5	4205-025201-000000
28	55	51	41	45	110	65	83	55	72	50	1 100	82	277	141	16	8	M 6	35	0,5	4205-028201-000000
30	55	51	41	45	110	65	83	55	72	50	1 200	82	259	141	16	8	M 6	35	0,5	4205-030201-000000
32	60	51	41	45	110	64	87	55	77	50	1 300	82	243	129	16	8	M 6	35	0,8	4205-032201-000000
35	60	51	41	45	110	64	87	55	77	50	1 400	82	222	129	16	8	M 6	35	0,7	4205-035201-000000
38	65	51	41	45	132	68	99	58	86	52	1 900	103	264	154	16	10	M 6	35	1,1	4205-038201-000000
40	65	51	41	45	132	68	99	58	86	52	2 050	103	251	154	16	10	M 6	35	1,1	4205-040201-000000
42	75	51	41	45	182	78	126	64	105	56	3 000	143	344	193	37	8	M 8	35	1,2	4205-042201-000000
45	75	51	41	45	182	78	126	64	105	56	3 200	143	321	193	37	8	M 8	35	1,1	4205-045201-000000
48	80	70	58	62	148	87	116	76	102	69	3 400	143	205	123	37	8	M 8	55	1,5	4205-048201-000000
50	80	70	58	62	148	87	116	76	102	69	3 500	143	197	123	37	8	M 8	55	1,4	4205-050201-000000
55	85	70	58	62	149	86	120	76	106	69	3 900	143	188	121	37	8	M 8	55	1,5	4205-055201-000000
60	90	70	58	62	177	92	134	80	117	72	5 300	179	215	143	37	10	M 8	55	1,6	4205-060201-000000
65	95	70	58	62	177	91	138	80	121	71	5 800	179	198	136	37	10	M 8	55	1,7	4205-065201-000000
70	110	86	70	76	226	115	168	99	145	88	9 800	282	220	140	73	10	M 10	60	3,1	4205-070201-000000
75	115	86	70	76	226	114	172	99	150	88	10 500	282	205	134	73	10	M 10	60	3,3	4205-075201-000000
80	120	86	70	76	263	122	189	103	161	91	13 500	339	231	154	73	12	M 10	60	3,5	4205-080201-000000
85	125	86	70	76	262	120	192	103	166	91	14 000	339	226	153	73	12	M 10	60	3,6	4205-085201-000000
90	130	86	70	76	261	119	196	103	170	90	15 000	339	213	147	73	12	M 10	60	3,8	4205-090201-000000
95	135	86	70	76	261	118	199	102	175	90	16 000	339	202	142	73	12	M 10	60	4,0	4205-095201-000000
100	145	110	92	98	306	150	223	130	191	115	24 500	495	203	140	126	12	M 12	80	6,1	4205-100201-000000
110	155	110	92	98	305	148	230	129	200	115	27 000	495	184	131	126	12	M 12	80	6,6	4205-110201-000000
120	165	110	92	98	345	155	254	132	218	119	34 500	578	197	143	126	14	M 12	80	7,1	4205-120201-000000
130	180	128	108	114	358	173	268	150	233	135	44 000	680	185	133	201	12	M 14	90	10,0	4205-130201-000000
140	190	128	108	114	406	182	296	155	252	139	55 500	794	200	147	201	14	M 14	90	10,6	4205-140201-000000
150	200	128	108	114	453	191	324	159	270	143	68 000	907	213	160	201	16	M 14	90	11,2	4205-150201-000000
160	210	128	108	114	450	188	330	158	279	143	72 500	907	202	154	201	16	M 14	90	11,9	4205-160201-000000
170	225	162	136	146	452	219	337	190	292	170	91 500	1 079	175	133	309	14	M 16	110	17,6	4205-170201-000000
180	235	162	136	146	504	229	366	195	312	175	111 000	1 234	189	145	309	16	M 16	110	18,5	4205-180201-000000
190	250	162	136	146	502	225	377	194	325	174	117 000	1 234	179	136	309	16	M 16	110	21,4	4205-190201-000000
200	260	162	136	146	502	223	384	193	335	174	123 000	1 234	170	131	309	16	M 16	110	22,4	4205-200201-000000
220	285	162	136	146	597	240	443	202	377	182	169 500	1 542	197	152	309	20	M 16	110	26,6	4205-220201-000000
240	305	162	136	146	641	246	477	205	404	186	203 500	1 696	199	156	309	22	M 16	110	28,7	4205-240201-000000
260	325	162	136	146	637	242	489	205	422	185	220 500	1 696	187	150	309	22	M 16	110	31,2	4205-260201-000000
280	355	197	165	177	699	283	533	242	460	218	304 000	2 174	181	143	605	18	M 20	130	46,8	4205-280201-000000
300	375	197	165	177	757	293	573	247	491	223	362 000	2 416	188	150	605	20	M 20	130	49,7	4205-300201-000000

Larger elements available on request.

Cone Clamping Elements RLK 404

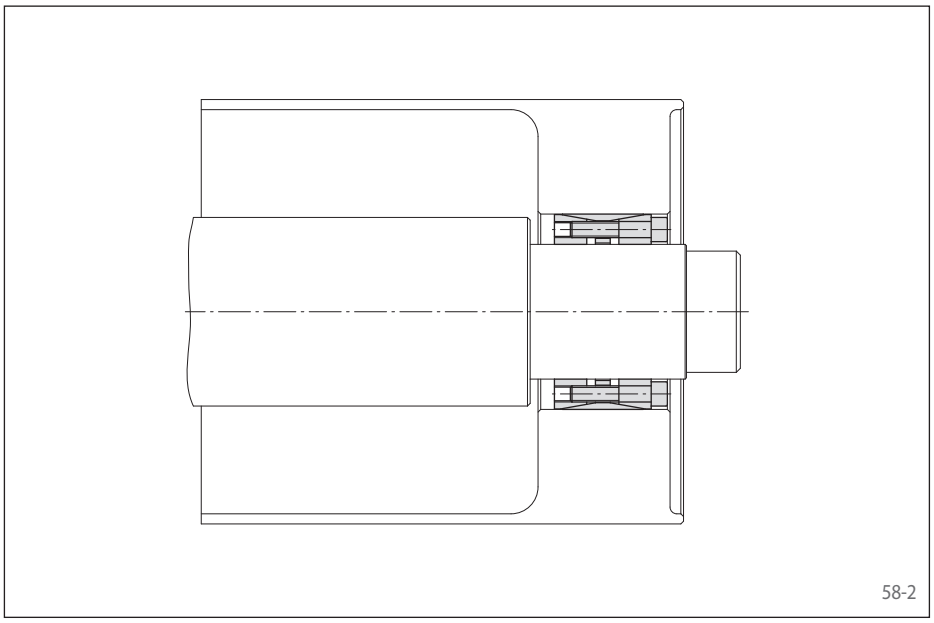
RINGSPANN®

centres the hub to the shaft
high transmissible torque


58-1

Features

- Centres the hub to the shaft
- High transmissible torque
- No axial displacement between hub and shaft during clamping procedure
- For shaft diameters between 70 mm and 600 mm


58-2

Application example

Backlash free attachment of a belt drum to the drive shaft of a conveyor belt with an Cone Clamping Element RLK 404.

The Cone Clamping Element centres the belt drum on the drive shaft. As no axial shift occurs during the clamping process, the axial position of the belt drum in relation to the drive shaft remains unchanged.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 59 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- h8 for shaft diameter d
- H8 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_z = 10 \ldots 25$ µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Cone Clamping Elements RLK 404.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

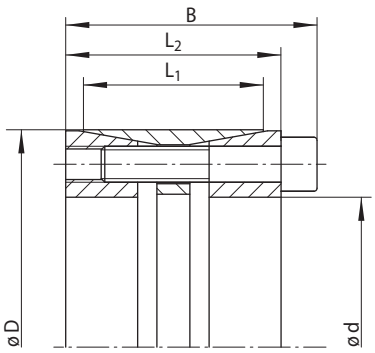
Cone Clamping Element RLK 404 for shaft diameter d = 100 mm:

- RLK 404, size 100 x 145
  Article number 4205-100401-000000

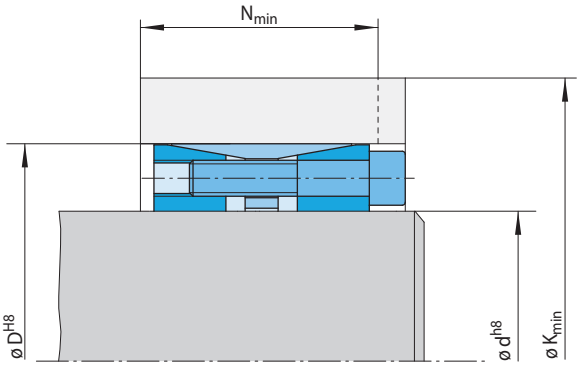
Cone Clamping Elements RLK 404

RINGSPANN®

centres the hub to the shaft
high transmissible torque



59-1



59-2

Dimensions											Technical Data									Article number
					Yield strength R_e of the hub material [N/mm²]						Transmissible torque or axial force		Contact pressure at		Clamping screws				Weight	
Size					200		320		500				Shaft	Hub	Tightening torque	Number	Size	Length		
d	D	B	L_1	L_2	K_{min}	N_{min}	K_{min}	N_{min}	K_{min}	N_{min}	M	F	P_W	P_N	M_S					
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm	kN	N/mm²	N/mm²	Nm			mm	kg	
70	110	72	50	62	206	88	169	70	148	59	7000	200	224	143	83	8	M 10	50	2,4	4205-070401-000000
75	115	72	50	62	208	87	173	69	152	59	7500	200	209	136	83	8	M 10	50	2,4	4205-075401-000000
80	120	72	50	62	234	97	191	76	166	63	10000	250	245	163	83	10	M 10	50	2,6	4205-080401-000000
85	125	72	50	62	236	96	195	75	170	63	10600	250	231	157	83	10	M 10	50	2,7	4205-085401-000000
90	130	72	50	62	250	100	205	78	179	65	12300	275	240	166	83	11	M 10	50	2,8	4205-090401-000000
95	135	72	50	62	252	99	209	77	183	64	13000	275	227	160	83	11	M 10	50	3,2	4205-095401-000000
100	145	84	60	72	285	118	232	92	201	76	18500	370	249	172	145	10	M 12	60	4,0	4205-100401-000000
110	155	84	60	72	289	115	239	90	210	76	20000	370	227	161	145	10	M 12	60	4,5	4205-110401-000000
120	165	84	60	72	307	119	255	93	224	78	24000	407	229	166	145	11	M 12	60	4,7	4205-120401-000000
130	180	94	65	82	345	135	284	105	248	87	33500	519	237	171	145	14	M 12	70	6,5	4205-130401-000000
140	190	94	65	82	364	138	298	107	261	89	38500	556	236	174	145	15	M 12	70	6,6	4205-140401-000000
150	200	94	65	82	367	136	306	106	270	88	41500	556	220	165	145	15	M 12	70	8,0	4205-150401-000000
160	210	94	65	82	385	138	320	108	283	90	47000	593	220	168	145	16	M 12	70	7,5	4205-160401-000000
170	225	107	78	93	431	159	349	126	306	105	64500	759	234	176	230	15	M 14	80	10,9	4205-170401-000000
180	235	107	78	93	433	157	356	125	315	104	68000	759	221	169	230	15	M 14	80	11,5	4205-180401-000000
190	250	119	88	105	436	166	367	133	327	113	76500	809	185	140	230	16	M 14	80	14,5	4205-190401-000000
200	260	119	88	105	473	172	389	139	345	117	91000	911	197	152	230	18	M 14	80	15,0	4205-200401-000000
220	285	127	96	111	509	183	421	148	374	125	113500	1036	188	145	355	15	M 16	90	20,8	4205-220401-000000
240	305	127	96	111	618	205	478	167	419	137	165500	1382	230	181	355	20	M 16	90	22,3	4205-240401-000000
260	325	127	96	111	641	206	502	169	442	139	188500	1451	223	178	355	21	M 16	90	22,9	4205-260401-000000
280	355	131	96	111	684	213	543	174	481	143	225500	1612	249	197	690	15	M 20	90	31,0	4205-280401-000000
300	375	131	96	111	717	217	570	178	506	146	257500	1719	248	199	690	16	M 20	90	31,3	4205-300401-000000
320	405	156	124	136	779	250	611	207	542	173	343500	2149	212	168	690	20	M 20	110	48,5	4205-320401-000000
340	425	156	124	136	785	246	628	206	560	172	365000	2149	200	160	690	20	M 20	110	51,2	4205-340401-000000
360	455	177	140	155	857	278	680	231	604	193	474500	2637	207	163	930	20	M 22	130	68,4	4205-360401-000000
380	475	177	140	155	864	274	696	229	622	192	501000	2637	196	157	930	20	M 22	130	73,5	4205-380401-000000
400	495	177	140	155	921	284	733	237	654	198	580000	2901	205	165	930	22	M 22	130	75,8	4205-400401-000000
420	515	177	140	155	977	293	774	242	685	203	664500	3165	213	173	930	24	M 22	130	80,0	4205-420401-000000
440	535	177	140	155	984	289	789	241	703	202	696000	3165	203	167	930	24	M 22	130	84,0	4205-440401-000000
460	555	177	140	155	992	286	805	240	722	202	727500	3165	194	161	930	24	M 22	130	86,0	4205-460401-000000
480	575	177	140	155	1024	289	833	242	746	204	791000	3297	194	162	930	25	M 22	130	87,0	4205-480401-000000
500	595	177	140	155	1033	287	849	241	765	203	824000	3297	186	156	930	25	M 22	130	90,0	4205-500401-000000
520	615	177	140	155	1106	300	900	248	801	211	960000	3692	200	169	930	28	M 22	130	96,0	4205-520401-000000
540	635	177	140	155	1106	300	909	251	819	210	996500	3692	193	164	930	28	M 22	130	100,0	4205-540401-000000
560	655	182	140	160	1156	307	947	255	849	215	1107500	3956	203	174	930	30	M 22	130	102,0	4205-560401-000000
580	675	182	140	160	1166	305	964	254	868	215	1147000	3956	196	168	930	30	M 22	130	105,0	4205-580401-000000
600	695	182	140	160	1177	303	980	253	886	214	1186500	3956	189	164	930	30	M 22	130	110,0	4205-600401-000000

Cone Clamping Elements Trantorque Mini - metric

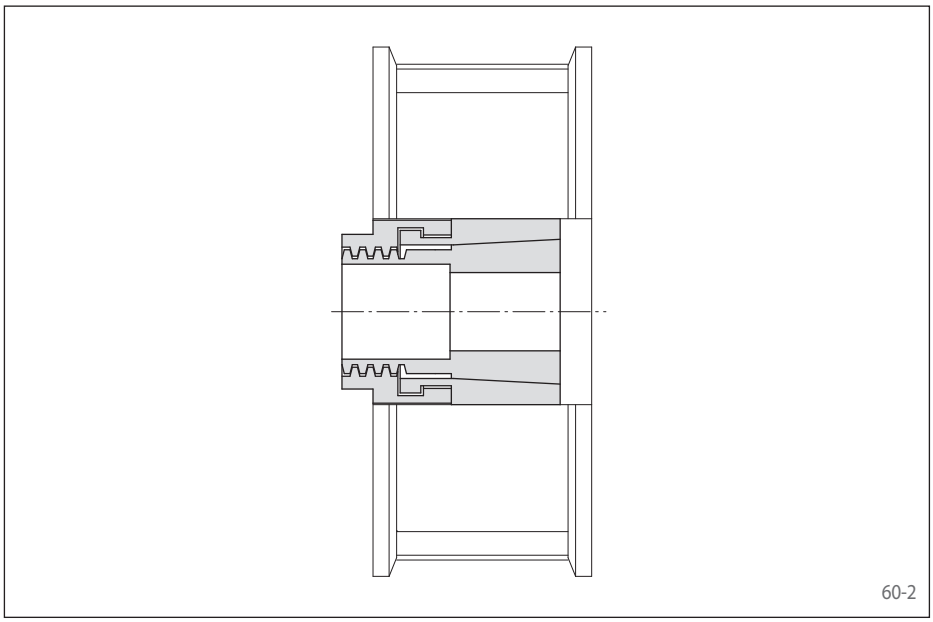
RINGSPANN®

for smallest shaft diameters
excellent concentricity

60-1

Features

- For smallest shaft diameters between 3 mm and 16 mm
- Excellent concentricity and transmission of bending moments



60-2

Application example

Cone Clamping Element Trantorque Mini provides a solution for mounting components in tight spaces on very small shafts, such as for a belt pulley.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 61 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- for shaft diameter d ± 0,04 mm
- for hub bore D ± 0,04 mm

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

During selection of the shaft material the contact pressure P_W of the particular size has to be observed.

Installation

Please request our installation and operating instructions for Trantorque Mini.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

Cone Clamping Element Trantorque Mini for shaft diameter d = 15 mm:

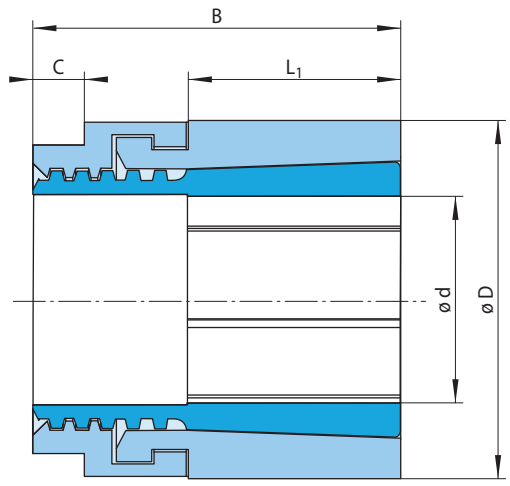
- Trantorque Mini, size 15 x 26

  Article number 4202-015100-000000

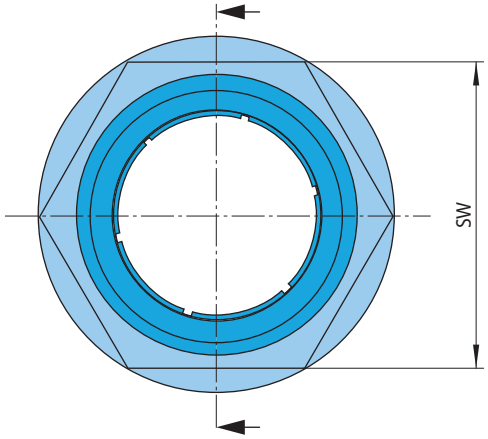
Cone Clamping Elements Trantorque Mini - metric

RINGSPANN®

for smallest shaft diameters
excellent concentricity



61-1



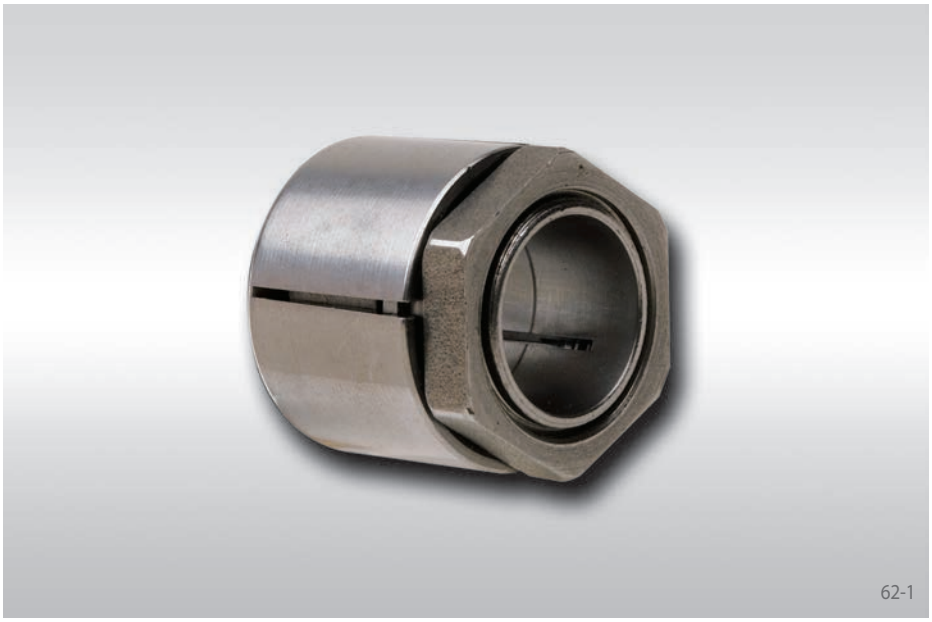
61-2

Dimensions						Technical Data						Article number
						Max. transmissible torque or axial force		Tightening torque of clamping nut	Contact pressure at		Weight	
Size									Shaft	Hub		
d mm	D mm	B mm	C mm	L_1 mm	SW mm	M Nm	F kN	M_S Nm	P_W N/mm²	P_N N/mm²	 kg	
3	16	19	3	10	13	10	6	14	597	112	0,02	4202-003100-000000
4	16	19	3	10	13	13	6	14	448	112	0,02	4202-004100-000000
5	16	19	3	10	13	16	6	14	358	112	0,02	4202-005100-000000
6	16	19	3	10	13	19	6	14	298	112	0,02	4202-006100-000000
7	20	22	3	11	16	36	10	28	351	123	0,03	4202-007100-000000
8	20	22	3	11	16	41	10	28	307	123	0,03	4202-008100-000000
9	20	22	3	11	16	47	10	28	273	123	0,03	4202-009100-000000
10	23	26	5	13	19	68	14	44	282	123	0,05	4202-010100-000000
11	23	26	5	13	19	75	14	44	257	123	0,05	4202-011100-000000
12	23	26	5	13	19	81	14	44	235	123	0,05	4202-012100-000000
14	26	29	5	16	22	123	18	66	209	113	0,06	4202-014100-000000
15	26	29	5	16	22	132	18	66	195	113	0,06	4202-015100-000000
16	26	29	5	16	22	140	18	66	183	113	0,06	4202-016100-000000

Cone Clamping Elements Trantorque OE - metric

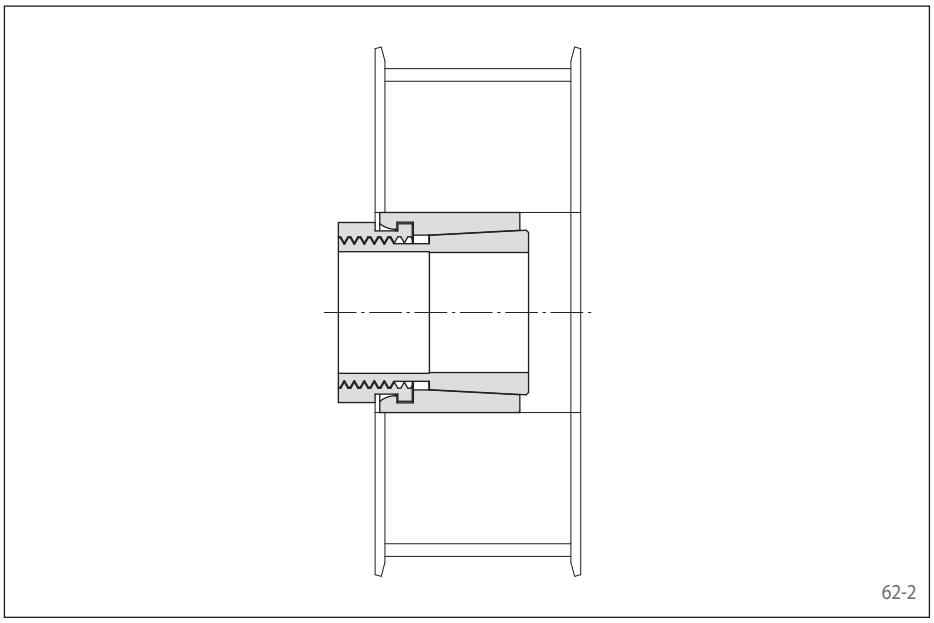
RINGSPANN®

for small shaft diameters
excellent concentricity



Features

- For small shaft diameters between 17 mm and 35 mm
- Excellent concentricity and transmission of bending moments
- Radial flat height



Application example

Backlash free mounting of a belt pulley with a Cone Clamping Element Trantorque OE.

Transmissible torques and axial forces

The transmissible torques or axial forces listed on page 63 are subject to the following tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Tolerances

- for shaft diameter d ± 0,08 mm
- for hub bore D ± 0,08 mm

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: R_z = 10 … 25 µm.

Materials

The following apply to the shaft and the hub:

- E-module ≥ 170 kN/mm^2

Installation

Please request our installation and operating instructions for Trantorque OE.

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced. Please refer to the technical points on pages 64 and 65.

Example for ordering

Cone Clamping Element Trantorque OE for shaft diameter d = 32 mm:

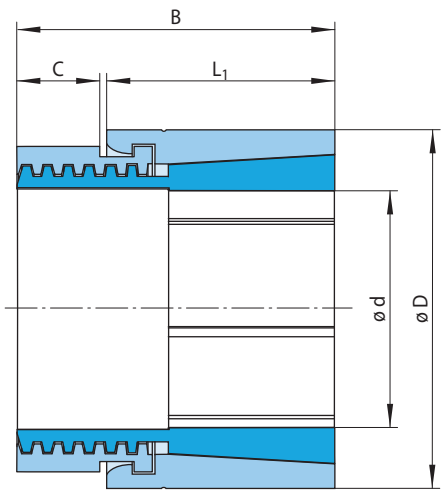
- Trantorque OE, size 32 x 50

  Article number 4202-032110-000000

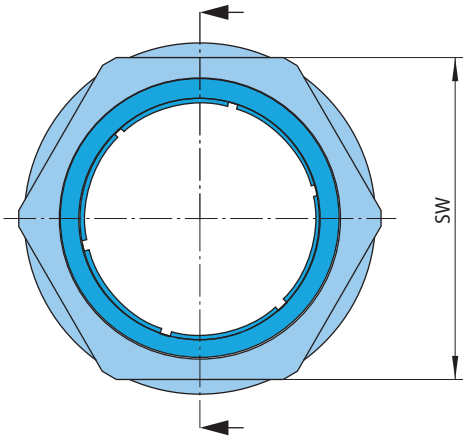
Cone Clamping Elements Trantorque OE - metric

RINGSPANN®

for small shaft diameters
excellent concentricity



63-1



63-2

Dimensions						Technical Data						Article number
Size						Max. transmissible torque or axial force		Tightening torque of clamping nut	Contact pressure at		Weight	
									Shaft	Hub		
d mm	D mm	B mm	C mm	L_1 mm	SW mm	M Nm	F kN	M_S Nm	P_W N/mm²	P_N N/mm²	 kg	
17	32	29	6	22	30	211	25	110	257	137	0,1	4202-017110-000000
18	32	29	6	22	30	223	25	110	243	137	0,1	4202-018110-000000
19	32	29	6	22	30	236	25	110	230	137	0,1	4202-019110-000000
20	35	32	7	24	32	303	30	150	241	138	0,1	4202-020110-000000
22	35	32	7	24	32	333	30	150	219	138	0,1	4202-022110-000000
24	38	34	7	25	36	405	34	185	204	129	0,2	4202-024110-000000
25	38	34	7	25	36	422	34	185	196	129	0,2	4202-025110-000000
28	45	41	11	29	46	515	37	240	162	101	0,3	4202-028110-000000
30	45	41	11	29	46	551	37	240	151	101	0,3	4202-030110-000000
32	50	43	11	30	50	601	38	265	135	87	0,4	4202-032110-000000
35	50	43	11	30	50	658	38	265	124	87	0,3	4202-035110-000000

Technical Points for Cone Clamping Elements

Clamping screw tightening torque

The tightening torque M_S listed in the tables must be achieved during assembly and must not be exceeded by more than 10%. If the indicated tightening torque M_S is not achieved, the transmissible torque or axial force, as well as the contact pressures at the shaft and at the hub will be proportionally reduced compared to the values listed in the tables for M or F as well as for P_W and P_N. When the indicated tightening torque M_S is undercut by more than 30%, please contact us.

Preload force for RLK 300

The preload force is achieved by clamping screws to be provided by the customer, with the tightening torque M_S and the preload force for metric screws E_S to be taken from the table to the right.

The preload forces indicated in the table are corrected for friction value deviations.

Size	Preload Force E_S [kN]			Tightening torque for μ_k= 0,1 M_S [Nm]		
	8.8	10.9	12.9	8.8	10.9	12.9
M 4	3,8	5,5	6,7	2,6	3,9	4,5
M 5	6,3	9,4	11,0	5,2	7,6	8,9
M 6	9,1	13,2	15,5	9,0	13,2	15,4
M 8	16,3	24,0	28,2	21,6	31,8	37,2
M 10	26,5	38,5	44,7	43	63	73
M 12	37,4	55,5	64,8	73	108	126
M 14	52,0	76,5	89,1	117	172	201
M 16	70,7	103,9	121,3	180	264	309
M 18	89,6	127,1	149,3	259	369	432
M 20	113,7	162,4	189,7	363	517	605
M 22	141,4	201,5	236,3	495	704	824
M 24	164,6	233,7	273,8	625	890	1 041

Number z and size of the clamping screws are to be chosen so that

$z \cdot E_S = E_1$ or E_2

For RLK 300, the preload force E_1 or E_2 may be increased or decreased as compared to the value indicated in the table. M, F, P_W and P_N change approximately proportionally. When the preload force is exceeded by more than double the value or lower by more than half the value indicated in the table, please contact us.

Design security

On page 7, the RINGSPANN calculation method for determination of the preload forces according to common friction-coefficient fluctuations is explained. As already shown there, the transmissible torques M and axial forces F listed in the tables are calculated based on the minimum preload force F_S, whereas the required hub outer diameters K_{min} are calculated based on the maximum preload force F_S. This assumes that the screw tightening torques M_S assumed in the table are exceeded by 10%.

The calculation for the elements RLK 300, assumes that the preload force of the clamping screws provided by the customer is distributed accordingly.

In the interest of the best design security, the following assumptions were made for the calculation of the Cone Clamping Elements:

For calculating	Assumed preload force	
	for all series except RLK 300	for series RLK 300
M and F	Lower limit value F_S	87% of the table value E_1 or E_2
P_W and P_N	Middle limit value F	table value E_1 or E_2
K_{min}	Upper limit value F_S	128% of the table value E_1 or E_2

Simultaneous transmission of torque and axial force

The transmissible torques M which are shown in the tables apply for axial forces F = 0 kN and conversely, the indicated axial forces F apply to torques M = 0 Nm. If torque and axial force are to be transmitted simultaneously, the transmissible torque and the transmissible axial force are reduced compared to the values listed in the tables for M and F.

For a given axial force F_A, the reduced torque M_{red} is calculated as:

$$M_{red} = \sqrt{M^2 - (F_A \cdot \frac{d}{2})^2}$$

For a given torque M_A, the reduced axial force F_{red} is calculated as:

$$F_{red} = \frac{2}{d} \sqrt{M^2 - {M_A}^2}$$

Bending moments

Where there are bending moments in addition to the torque M_A or the axial force F_A, the transmissible torque or transmissible axial force is reduced compared to the values for M or F as listed in the tables. Please contact us.

Hollow shafts

When clamping Cone Clamping Elements on hollow shafts, the tangential stress σ_{tWi} must not exceed the yield strength R_e of the hollow shaft material. For double arrangements of Cone Clamping Elements RLK 300, assume twice the value for L_1.

$$\sigma_{tWi} = 1{,}27 \cdot P_W \cdot \frac{2}{1 - {C_W}^2} \quad \text{with}$$

$$C_W = \frac{d_{Wi}}{d}$$

Hub Design

For the different Cone Clamping Element series, the tables list the required hub width N_{min} and the required hub outer diameter K_{min} for three exemplary yield strengths R_e of the hub. Thereby, the hub is to be arranged as seen in figure 65-1 for Cone Clamping Elements with a fixed backstop point. For Cone Clamping Elements without a fixed backstop point, the hub is to be arranged according to figure 65-2. For this, we practically assume that the screw heads of the Cone Clamping Element are flush with the hub on one side.

When the hub width in the application N_A is smaller than the required hub width N_{min} and the yield strengths R_e of the hub material is known, the required hub outer diameter K_{min} can be calculated approximately as follows:

$$K_{min} = 1{,}2 \cdot D \cdot \frac{H - 1{,}25}{H - 3} \quad \text{with}$$

$$H = \left(\frac{R_e}{1{,}27 \cdot P_N} \cdot \frac{N_A}{L_T} \right)^2$$

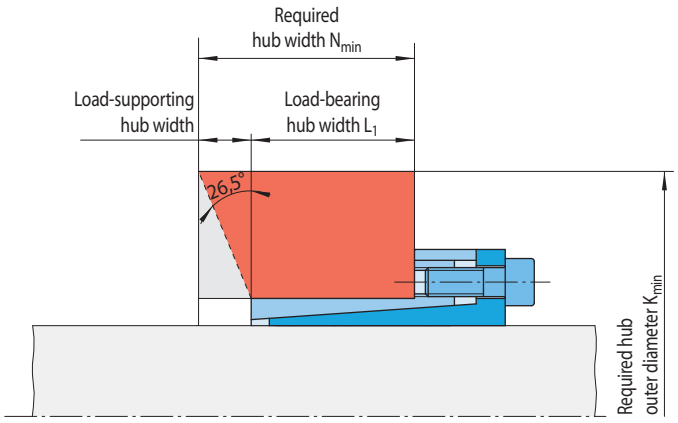
When the hub width N_A is known and the hub outer diameter K_A is known, the hub material yield strength R_e must be higher than the equivalent stress σ_v in the hub.

$$\sigma_v = 1{,}27 \cdot P_N \cdot \frac{L_T}{N_A} \cdot \frac{\sqrt{3 + C_N^4}}{1 - C_N^2} \quad \text{with}$$

$$C_N = \frac{D}{K_A}$$

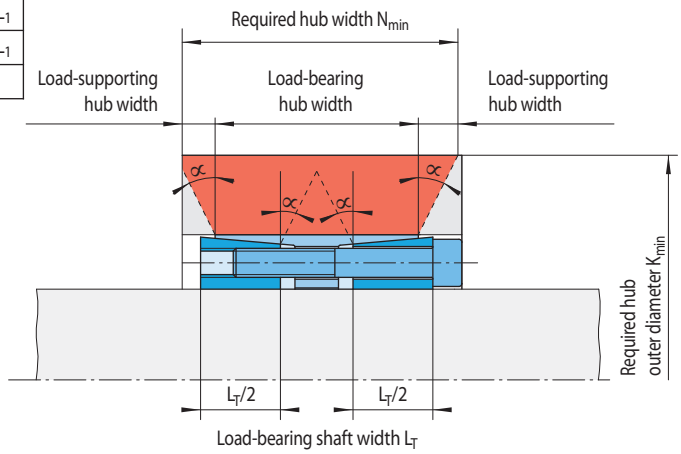
The load-bearing hub width N_A in the application must not be smaller than the load-bearing hub width L_1.

$L_T = L_1$



Hub arrangement for Cone Clamping Elements with a fixed backstop point 65-1

	L_T
RLK 402	0,8 x L_1
RLK 404	0,9 x L_1
other	L_1



$\alpha = 26{,}5°$

Hub arrangement for Cone Clamping Elements without a fixed backstop point 65-2

Formula symbols

d = Shaft diameter [mm]

d_{Wi} = Inner hollow shaft diameter [mm]

D = Hub bore [mm]

E_1, E_2 = Preload force according to table [kN]

E_S = Preload force for metric screws according to table [kN]

F = Transmissible axial force according to table [kN]

F_A = Maximum actual application axial force [kN]

F_{red} = Reduced axial force [kN]

F_S = Preload force [kN]

K_A = Hub outer diameter in the application [mm]

K_{min} = Required hub outer diameter according to table or calculation [mm]

L_1 = Load-bearing axial hub width according to table [mm]

L_T = Load-bearing shaft width [mm]

M = Transmissible torque according to table [Nm]

M_A = Maximum actual application torque [Nm]

M_{red} = Reduced torque [Nm]

M_S = Screw tightening torque [Nm]

N_A = Hub width in the application [mm]

N_{min} = Required hub width according to table [mm]

P_N = Contact pressure at the hub according to table [N/mm²]

P_W = Contact pressure at the shaft according to table [N/mm²]

R_e = Hub material yield strength [N/mm²]

σ_{tWi} = Tangential stress in the hollow shaft [N/mm²]

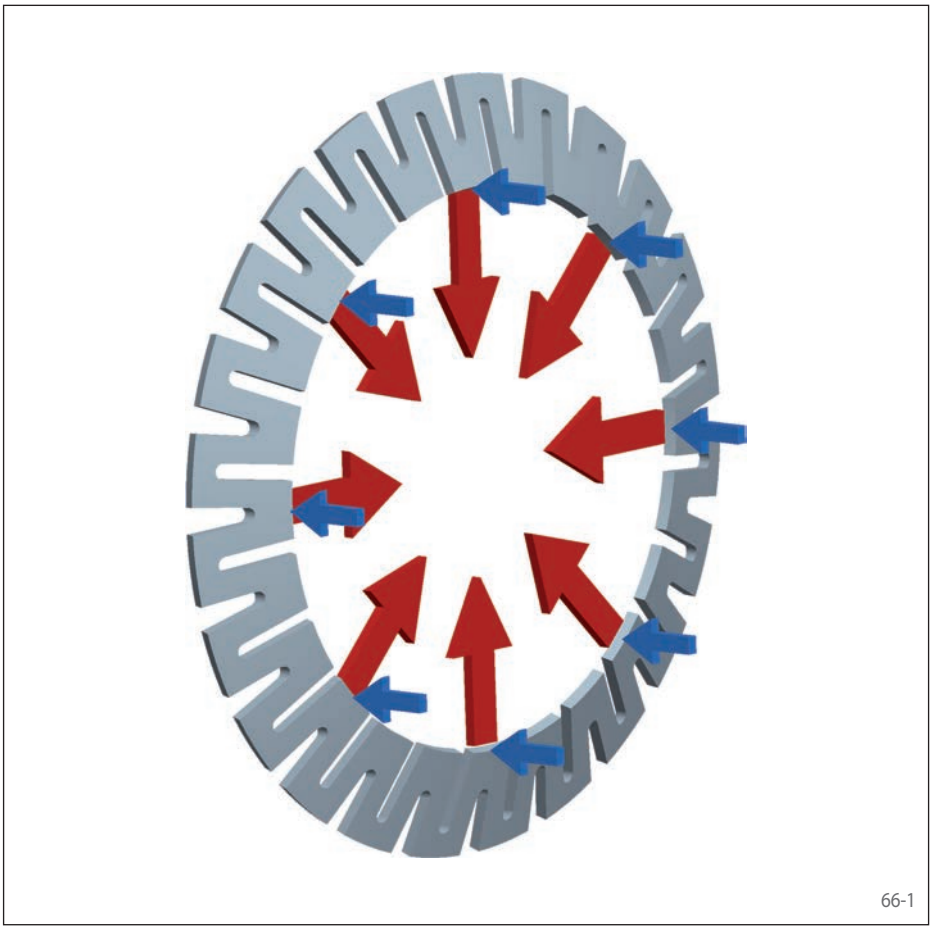
σ_v = Equivalent stress in the hub [N/mm²]

C_N, C_W and H are reference values without units.

The RINGSPANN Star Disc is a flat conical ring made of special hardened spring steel. The characteristic slot pattern, alternating from the outside to the inside edge, gives the Star Discs its very high elasticity. The outer circumference of the Star Disc is supported in the bore of the hub to be connected. The axial actuating force applied to the inner circumference of the Star Disc causes an elastic change in the conical angle and thus reduces the inner circumference of the Star Disc (see figure 66-1). A particular advantage of this configuration is that the axial actuating force is converted virtually without friction loss into a much higher radial force. This facilitates simple actuating devices, such as clamping with the aid of a central clamping screw or a manually adjusted knurled nut, for example.

Depending upon the torque required, Star Discs are used singly or in multiple arrangements as disc packs, generally consisting of a maximum of 16 discs. This arrangement provides for space-saving, clamping connections.

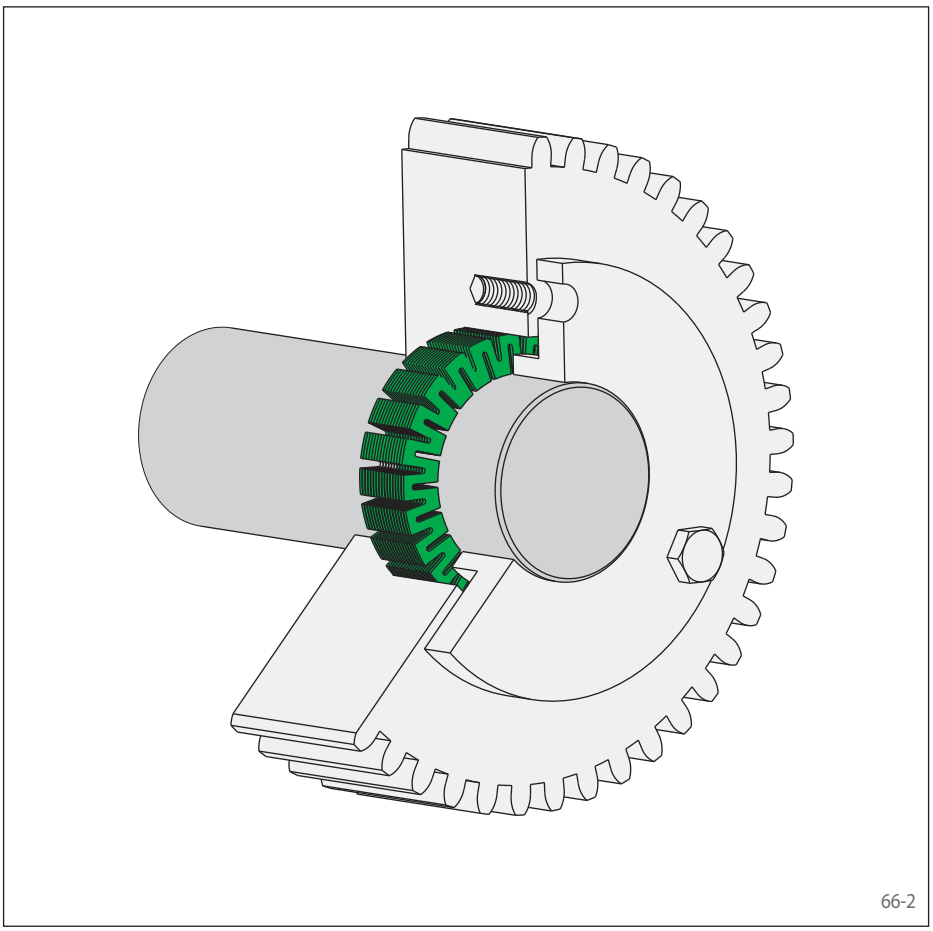
Clamping connections with Star Discs are easy to release even after frequent clamping. This makes the Star Disc the ideal clamping element, e.g. in adjustment devices.



66-1

Features

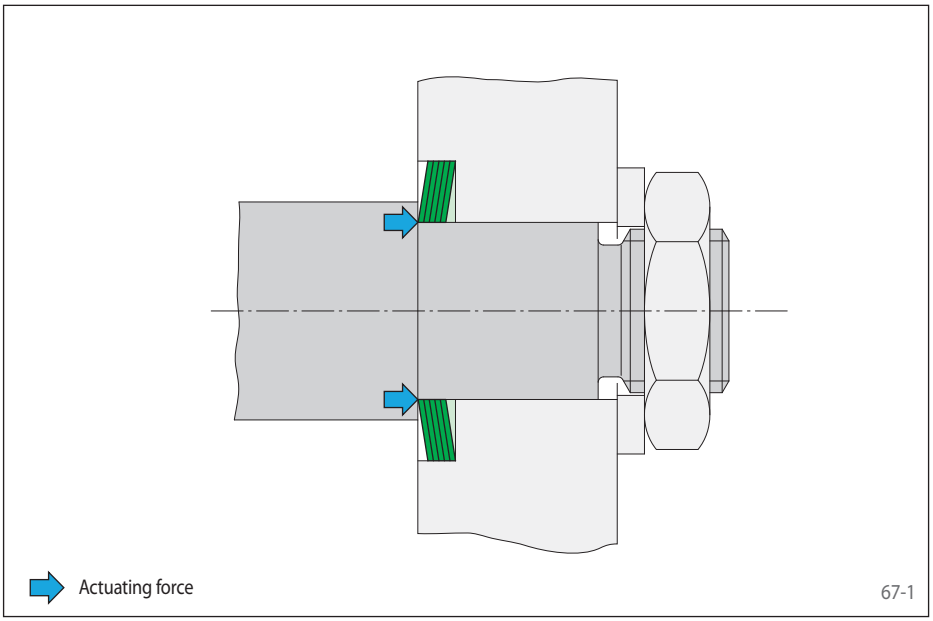
- For frequent clamping and release
- Short axial width
- Adjustable to the required torque by multiple arrangements in the form of disc packs
- Low actuating force required, thus ideal for manual actuation



66-2

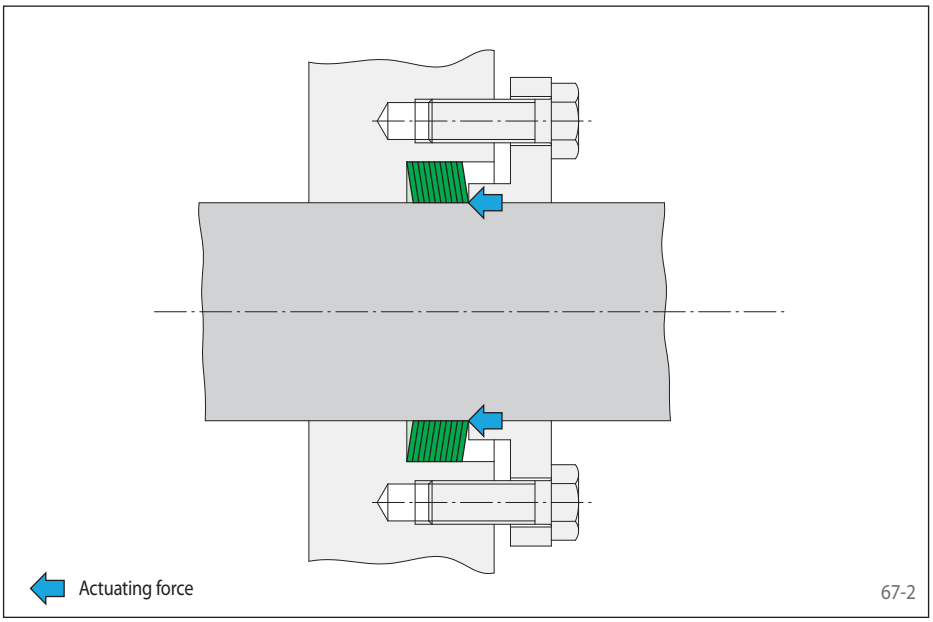
Clamping connection at the shaft end

Figure 67-1 shows a clamping connection with a disc pack that consists of five Star Discs. The preload force of the clamping nut is transmitted to the disc pack by the opposite shaft shoulder.



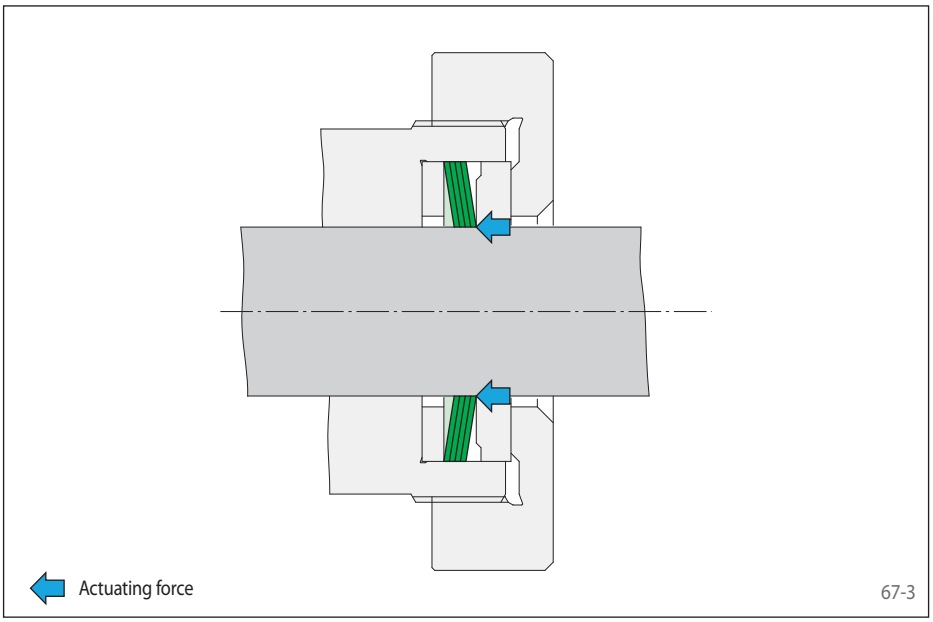
Clamping connection on a continuous shaft

Figure 67-2 shows a clamping connection with a disc pack consisting of ten Star Discs. The preload force of the screws acts on the disc set through a clamping flange.



Clamping connection with a threaded ring

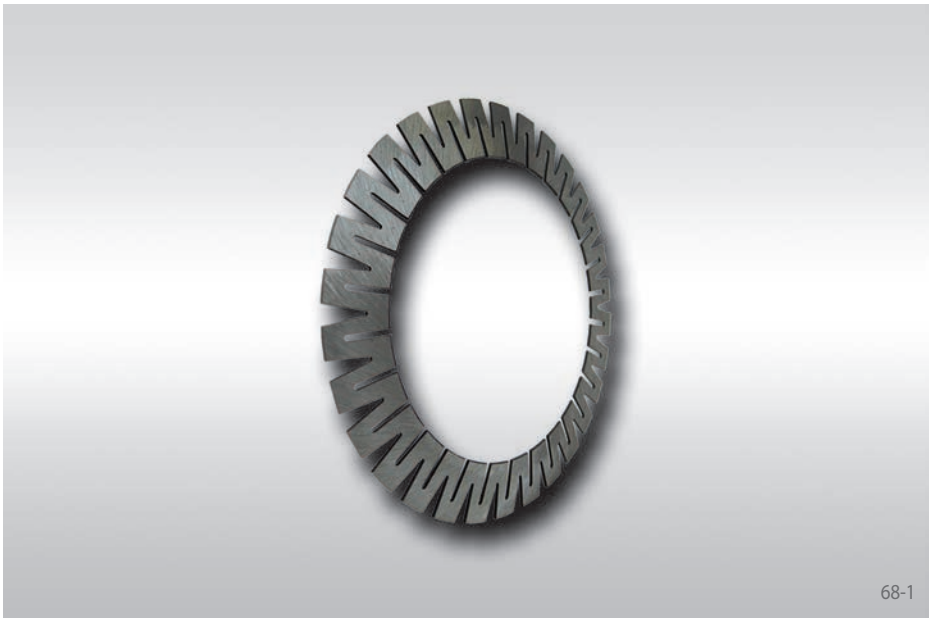
Figure 67-3 shows a clamping connection with a disc pack consisting of four Star Discs and a manually adjusted threaded ring. Between the disc pack and the threaded ring, there is a pressure disc. It transmits the axial actuation force to the disc pack inner diameter and thereby prevents the disc pack from turning as well when the threaded ring is tightened.



Star Discs

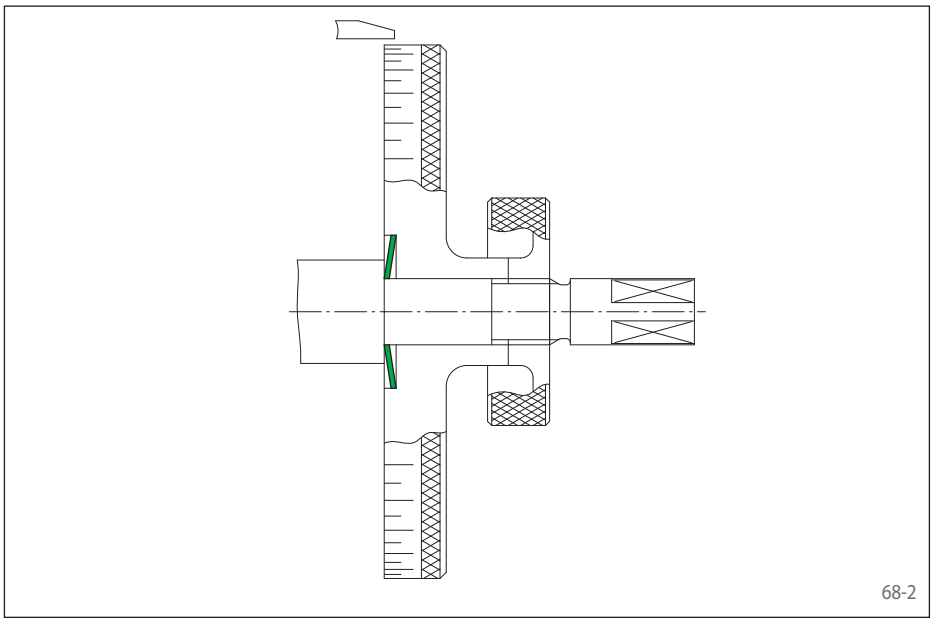
for frequent clamping and loosening short axial width

RINGSPANN®



Features

- For frequent clamping and release
- Short axial width
- Adjustable to the required torque by multiple arrangements in the form of disc packs
- Low actuating force required, thus ideal for manual actuation



Application example

Backlash free attachment of a graduated dial in a feed unit with a Star Disc. After release of the right knurled nut, the dial can be adjusted in circumferential direction.

Transmissible torques

The transmissible torques listed on page 69 are subject to the following information about disc pack, tolerances, surface characteristics and material requirements. Please contact us in the case of deviations.

Disc Pack

The torque M stated in the table applies for one star disc. In case of multiple arrangements of star discs in disc packs of up to 16 star discs, the following applies:

Torque	$M_n = n \cdot M$
Preload force	$E_n = n \cdot E$
Load-bearing axial width	$L_1 \approx n \cdot s$

Tolerances

- h9 for shaft diameter d
- H9 for hub bore D

Surfaces

Average surface roughness at the contact surfaces between the shaft and the hub bore: $R_z = 10 \ldots 25$ µm.

Materials

The following apply to the shaft and the hub:

- Yield strength $R_e \geq 300$ N/mm^2
- E-module ≥ 170 kN/mm^2

Example for ordering

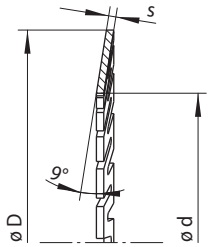
100 Star Discs for shaft diameter d = 20 mm:

- 100 pcs. A 20 SS 37
  Article number 1032-037004-000000

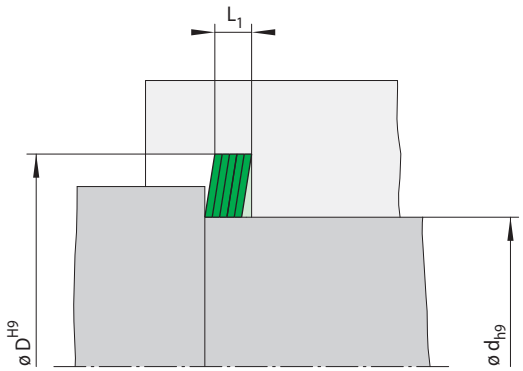
Star Discs

for frequent clamping and loosening
short axial width

RINGSPANN®



69-1



69-2

Dimensions			Technical Data					Type	Article number
Size			Transmissible torque	Contact pressure at Shaft	Contact pressure at Hub	Preload force	Weight		
d mm	D mm	s mm	M Nm	P_W N/mm²	P_N N/mm²	E N	kg/100 pieces		
4	14	0,50	0,16	100	29	140	0,3	A 4 SS 14	1032-014002-000000
5	14	0,50	0,29	116	41	210	0,3	A 5 SS 14	1032-014003-000000
6	18	0,50	0,34	94	31	180	0,5	A 6 SS 18	1032-018001-000000
8	18	0,50	0,72	113	50	310	0,5	A 8 SS 18	1032-018003-000000
10	22	0,60	1,26	105	48	430	0,9	A 10 SS 22	1032-022002-000000
11	22	0,60	1,53	105	53	500	0,8	A 11 SS 22	1032-022003-000000
12	27	0,65	1,95	104	46	520	1,4	A 12 SS 27	1032-027001-000000
14	27	0,65	2,80	110	57	680	1,3	A 14 SS 27	1032-027003-000000
15	27	0,65	3,30	113	63	770	1,2	A 15 SS 27	1032-027004-000000
16	37	0,90	5,10	111	48	1030	3,7	A 16 SS 37	1032-037001-000000
17	37	0,90	5,90	113	52	1150	3,6	A 17 SS 37	1032-037002-000000
18	37	0,90	6,80	117	57	1270	3,5	A 18 SS 37	1032-037003-000000
20	37	0,90	8,70	121	65	1540	3,2	A 20 SS 37	1032-037004-000000
22	42	0,90	9,90	114	60	1490	4,3	A 22 SS 42	1032-042001-000000
24	42	0,90	12,2	118	67	1760	4,0	A 24 SS 42	1032-042002-000000
25	42	0,90	13,5	120	71	1900	3,8	A 25 SS 42	1032-042003-000000
28	52	1,15	21,0	116	63	2550	8,2	A 28 SS 52	1032-052001-000000
30	52	1,15	25,0	121	70	2900	7,7	A 30 SS 52	1032-052002-000000
35	52	1,15	33,5	119	80	3750	6,3	A 35 SS 52	1032-052004-000000
38	62	1,15	40,5	122	75	3600	10,2	A 38 SS 62	1032-062001-000000
40	62	1,15	45,5	124	80	4000	9,5	A 40 SS 62	1032-062002-000000
42	62	1,15	51,0	126	85	4450	8,8	A 42 SS 62	1032-062003-000000
45	62	1,15	60,0	129	94	5200	7,7	A 45 SS 62	1032-062004-000000
48	70	1,15	68,0	128	88	5000	11,0	A 48 SS 70	1032-070001-000000
50	70	1,15	75,0	130	93	5500	10,2	A 50 SS 70	1032-070002-000000
55	70	1,15	93,0	134	105	7000	8,0	A 55 SS 70	1032-070003-000000
60	80	1,15	112	135	101	6800	11,9	A 080 060 IV	1032-080001-000000
65	90	1,15	131	135	97	6700	16,5	A 090 065 IV	1032-090001-000000
70	90	1,15	154	137	106	8000	13,6	A 090 070 IV	1032-090002-000000
75	100	1,15	176	136	102	7800	18,6	A 100 075 IV	1032-100001-000000
80	100	1,15	205	139	111	9300	15,3	A 100 080 IV	1032-100002-000000
85	110	1,15	230	138	107	9000	20,7	A 110 085 IV	1032-110001-000000
100	120	1,15	325	141	118	11900	18,7	A 120 100 IV	1032-120001-000000

Technical Points for Star Discs

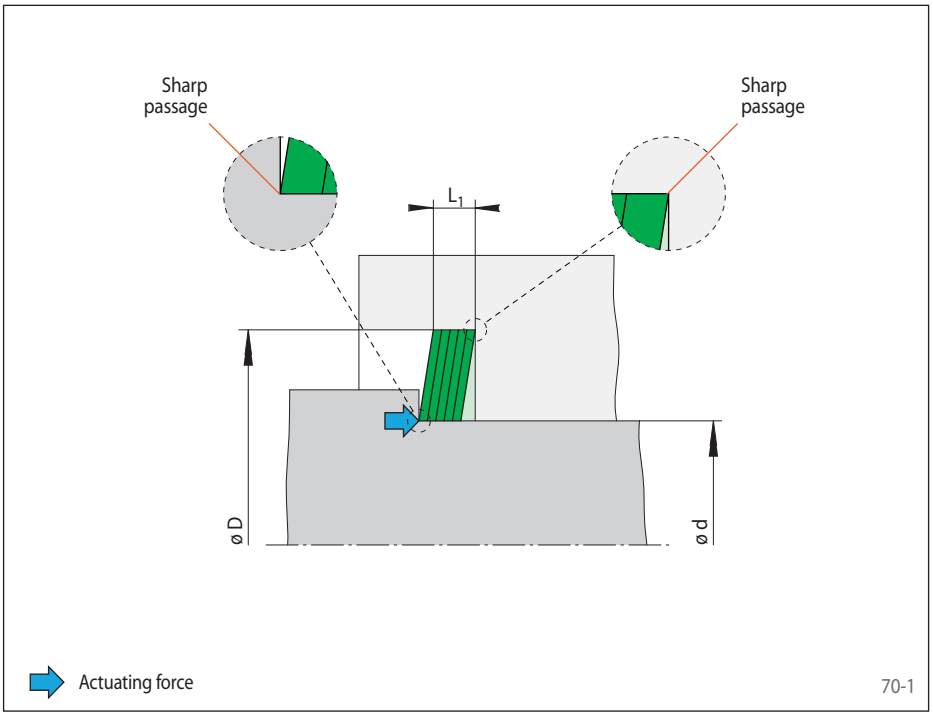
Design points

The outer diameter D of the Star Disc is supported in the bore of the hub to be connected. The Star Disc seats with the concave face of the cone against the fixed backstop point of the hub. The axial actuation force must be applied opposite at the front side of the inner diameter d.

The passages from shaft diameter d and supporting diameter D to the respective plane surfaces must be sharp-edged, without corner arc or undercut.

The shaft must be centred according to the requirements.

If a torque M_A and an axial force F_A are to be transmitted at the same time, please contact us.



Frequent clamping and release

Clamping connections with Star Discs can be easily released repeatedly. They can be clamped and released up to 5 000 times. Star Discs from size A 080 060 IV are durable and not subject to this limitation.

For loosening the clamping connection, displace the hub against the shaft

Preload force

The preload force is achieved by clamping screws to be provided by the customer, with the tightening torque M_S and the preload force for metric screws E_S to be taken from the table to the right.

The preload forces indicated in the table are corrected for friction value deviations.

Size	Preload force E_S [kN]			Tightening torque for μ_k=0,1 M_S [Nm]		
	8.8	10.9	12.9	8.8	10.9	12.9
M 4	3,8	5,5	6,7	2,6	3,9	4,5
M 5	6,3	9,4	11,0	5,2	7,6	8,9
M 6	9,1	13,2	15,5	9,0	13,2	15,4
M 8	16,3	24,0	28,2	21,6	31,8	37,2

Number z and size of the clamping screws are to be chosen so that

E or $E_n = z \cdot E_S \cdot 1\,000$

If the preload force E or E_n is exceeded, the Star Disc will be overstressed or the permissible contact pressure will be exceeded.

Disc Pack

Star Discs are used separately or combined to disc packs according to the required torque. For multiple arrangements in a disc pack of n = 16 Star Discs, the following applies:

Torque $M_n = n \cdot M$

Preload force $E_n = n \cdot E$

Load-bearing axial width $L_1 \approx n \cdot s$

For disc packs with more than 16 Star Discs, any Star Discs exceeding 16 will only transmit approx. 50% of the torque M. The maximum number of Star Discs in a pack is limited to 25.

Hollow Shafts

When clamping Star Discs on hollow shafts, the tangential stress σ_{tWi} must not exceed the yield strength R_e of the hub material.

$$\sigma_{tWi} = 1{,}27 \cdot P_W \cdot \frac{2}{1 - C_W^2} \quad \text{with}$$

$$C_W = \frac{d_{Wi}}{d}$$

Hub Design

The contact pressure P_W leads to radial stress in the shaft that is usually not critical for solid steel shafts.

There is always a tangential stress σ_t in the hub, and for thin-walled hubs it may be a multiple of the initiated pressure P_N. The amount of the applicable tangential stress depends on the load-bearing hub width N_{min} the hub outer diameter K_{min} and the pressure P_N. For the load-bearing hub width N_{min} is taken into account, that the hub pressure P_N is carried by the load-bearing width L_1, and in an angle of ca. 26,5° beyond it (see figure 71-1).

When the load-bearing hub width N_A and the yield strength R_e of the hub material are given, the required hub outer diameter K_{min} can be calculated approximately as follows:

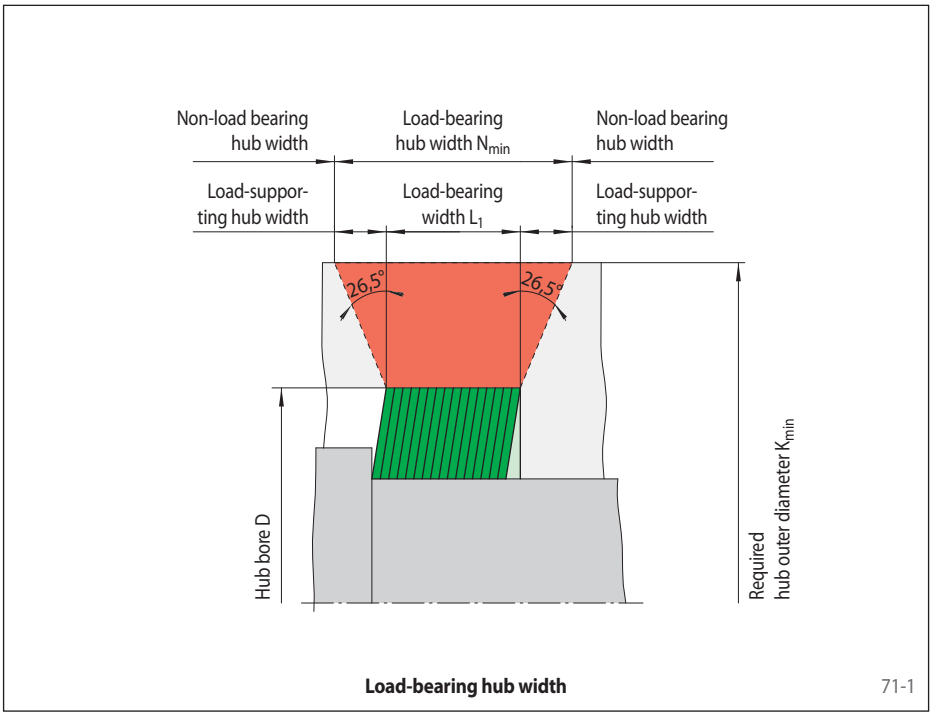
$$K_{min} = 1{,}2 \cdot D \cdot \frac{H - 1{,}25}{H - 3} \quad \text{with}$$

$$H = \left(\frac{R_e}{1{,}27 \cdot P_N} \cdot \frac{N_A}{L_1} \right)^2$$

When the hub width N_A and the hub outer diameter K_A are given, the hub material yield strength R_e must be higher than the equivalent stress σ_v in the hub.

$$\sigma_v = 1{,}27 \cdot P_N \cdot \frac{L_1}{N_A} \cdot \frac{\sqrt{3 + C_N^4}}{1 - C_N^2} \quad \text{with}$$

$$C_N = \frac{D}{K_A}$$



Load-bearing hub width 71-1

Formula symbols

d = Shaft diameter [mm]

d_{Wi} = Inner hollow shaft diameter [mm]

D = Hub bore [mm]

E = Preload force according to table [N]

E_n = Preload force disc pack [N]

E_S = Preload force for metric screws according to table [kN]

F_A = Maximum actual application axial force [kN]

K_A = Hub outer diameter in the application [mm]

K_{min} = Required hub outer diameter according to table or calculation [mm]

L_1 = Load-bearing axial width [mm]

M = Transmissible torque according to table [Nm]

M_A = Maximum actual application torque [Nm]

M_n = Max. transmissible torque of the Star Disc pack [Nm]

M_S = Screw tightening torque [Nm]

n = Number of star discs in the pack

N_A = Load-bearing hub width in the application [mm]

P_N = Contact pressure at the hub according to table [N/mm²]

P_W = Contact pressure at the shaft according to table [N/mm²]

R_e = Hub material yield strength [N/mm²]

s = Axial width according to table [mm]

z = Number of clamping screws

σ_t = Tangential stress in the hub [N/mm²]

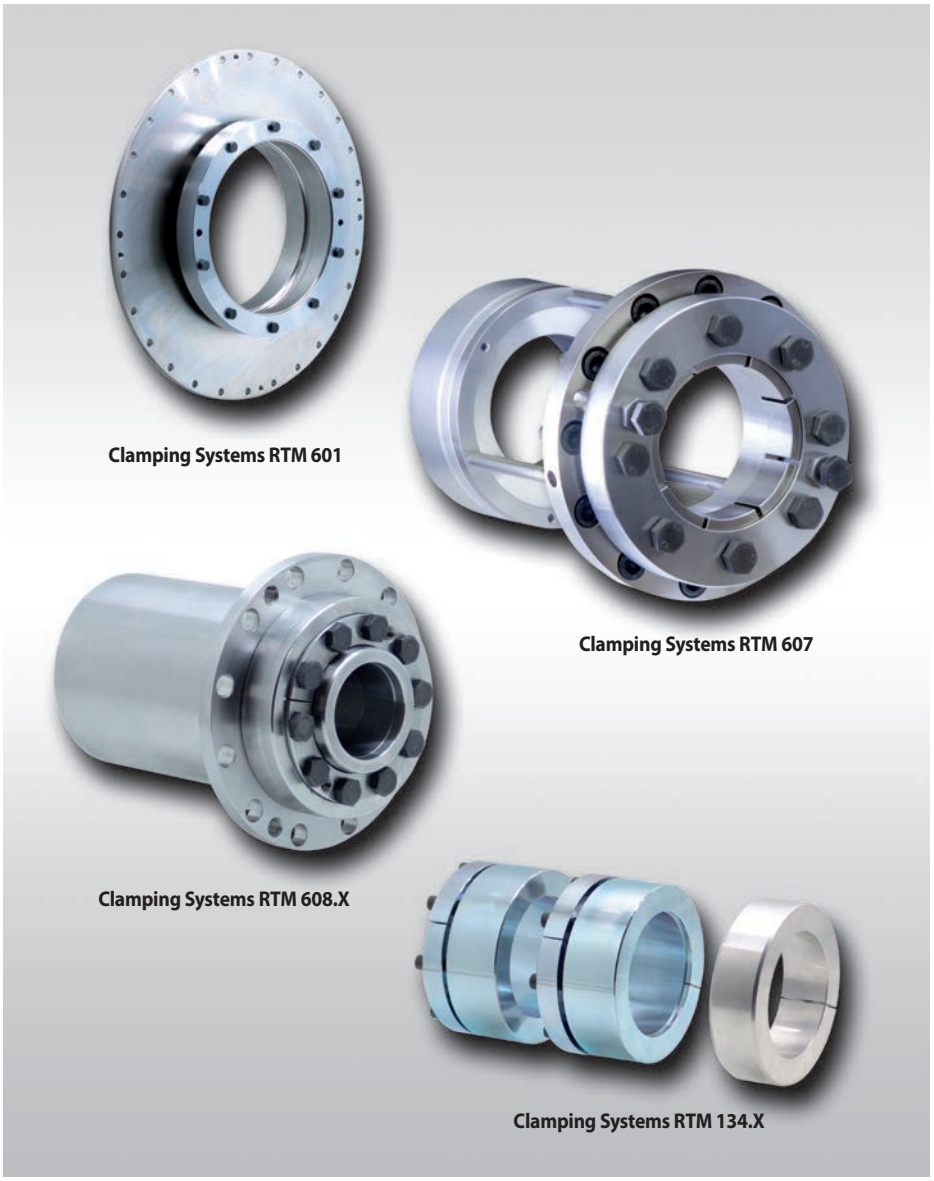
σ_{tWi} = Tangential stress in the hollow shaft [N/mm²]

σ_v = Equivalent stress in the hub [N/mm²]

C_N, C_W and H are reference values without units.

The advantage of torque motors can be fully exploited only if the torque motor is connected to the machine shaft in an appropriate manner for the application in question. RINGSPANN has developed Clamping Systems that meet the specific requirements of both torque motors and machine shafts which are often configured as thin-walled hollow shafts.

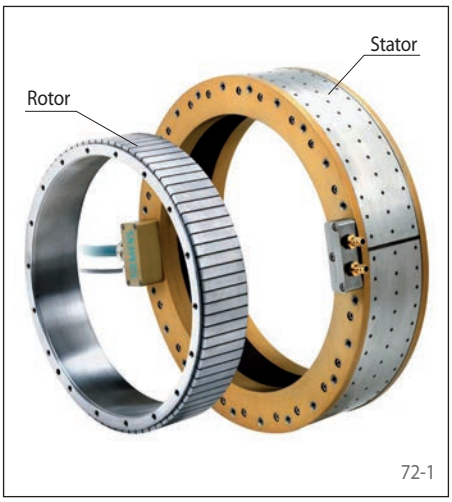
Both complete torque motors and integrated torque motors can be connected by friction to machine shafts with RINGSPANN torque motor clamping systems. In addition to secure, backlash free torque transmission, these systems also ensure precise centring of the torque motor on the machine shaft.



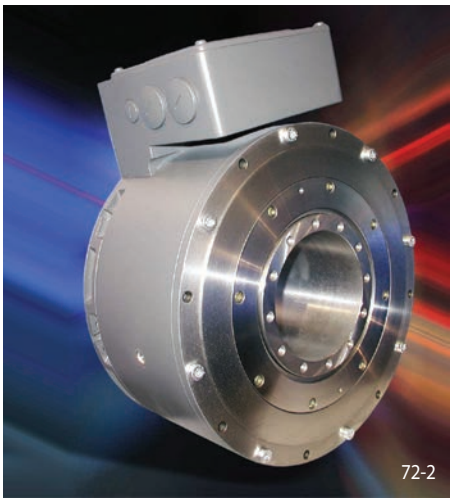
Torque motors

Torque motors are rotation angle controlled, permanent magnet excited synchronous servomotors with large numbers of magnetic pole pairs which produce correspondingly high torques in the lower rpm range (0 - approximately 250 rpm, depending on the number of pole pairs). Thanks to modern high performance electronics, torque motors, as direct drive motors, are capable of meeting such system requirements as high repetition and control accuracy, low energy consumption, low noise levels, high dynamics, ease of maintenance and reduced space requirements.

Torque motors are designed as „integrated torque motors" (Fig. 72-1) with rotors and stators or as self-enclosed „complete torque motors" with bearings" (Fig. 72-2).



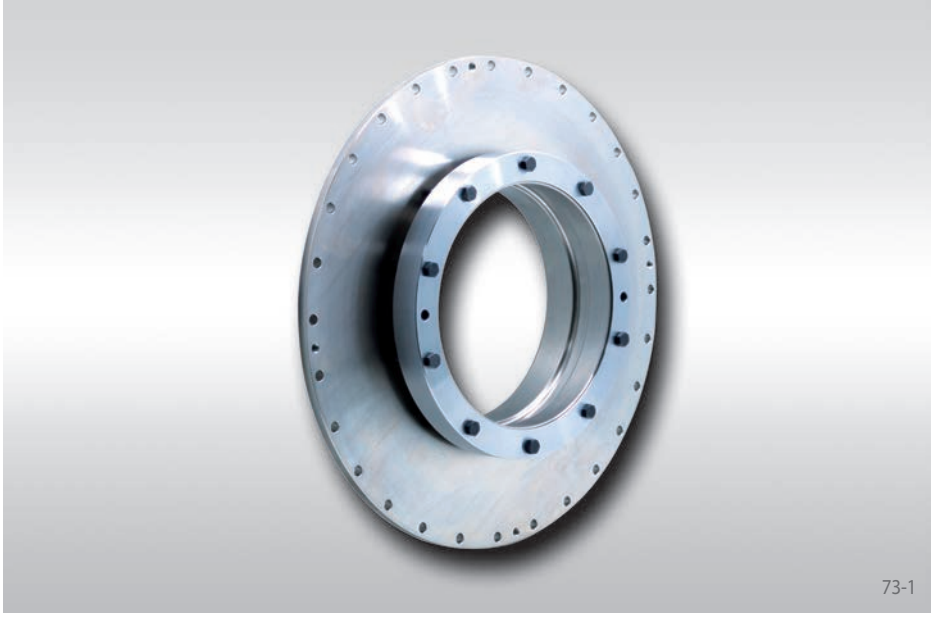
Source: Siemens AG



Source: Siemens AG

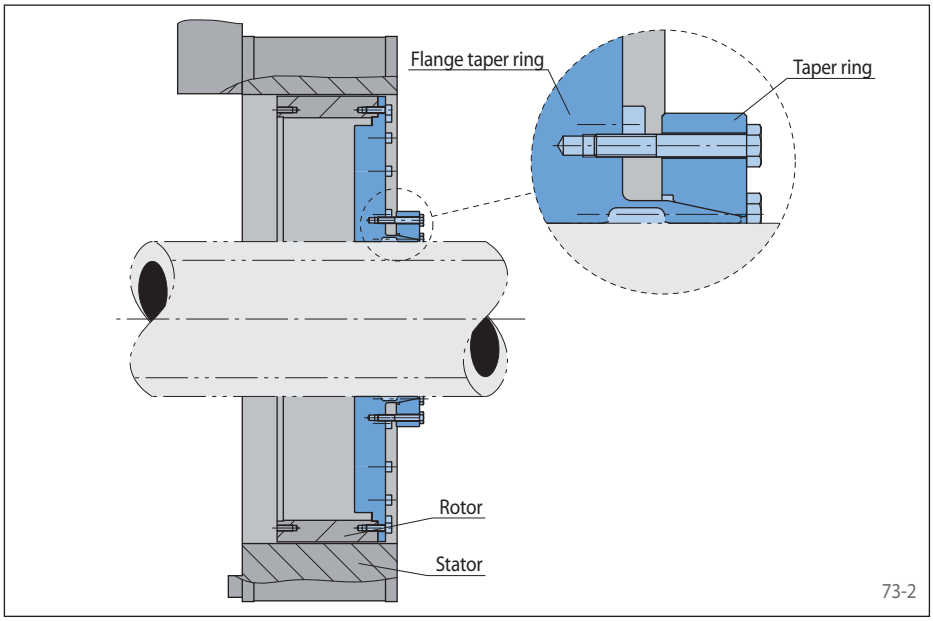
Clamping Systems RTM 601

for integrated torque motors
for mounting and centring rotors on shafts or hollow shafts



Features

- Provides a mechanical connection and centring between rotor and machine shaft
- Backlash free, torsion-proof transmission of torque generated by the torque motor
- High true run accuracy between rotor and a stator mounted on the machine
- Low contact pressures exerted on machine shafts or hollow shafts
- Taper Collet chemically nickel-coated to prevent fretting corrosion
- Easily removable clamping element, even after long periods of operation



Configuration

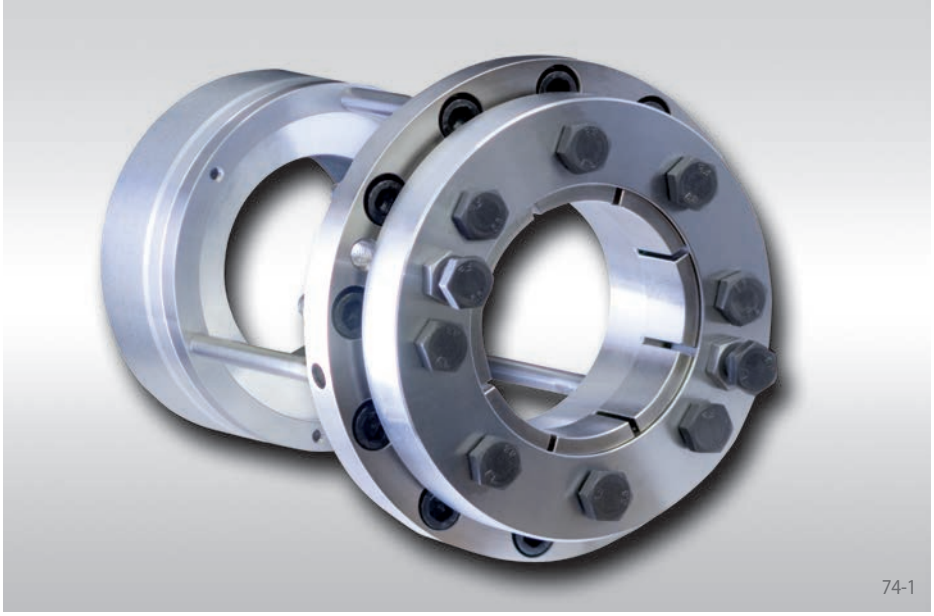
The Clamping System RTM 601 consists of a flange taper ring and taper ring. The taper ring clamps the flange taper ring to the machine shaft with the aid of clamping screws in such a way that the torque generated between the stator and rotor of the integrated torque motor is transmitted to the machine shaft via a frictional, backlash free connection.

If you have an application for which the Clamping System RTM 601 is suited, please submit your enquiry, including the designation of the torque motor to be used as well as the shaft dimensions.

Clamping Systems RTM 607

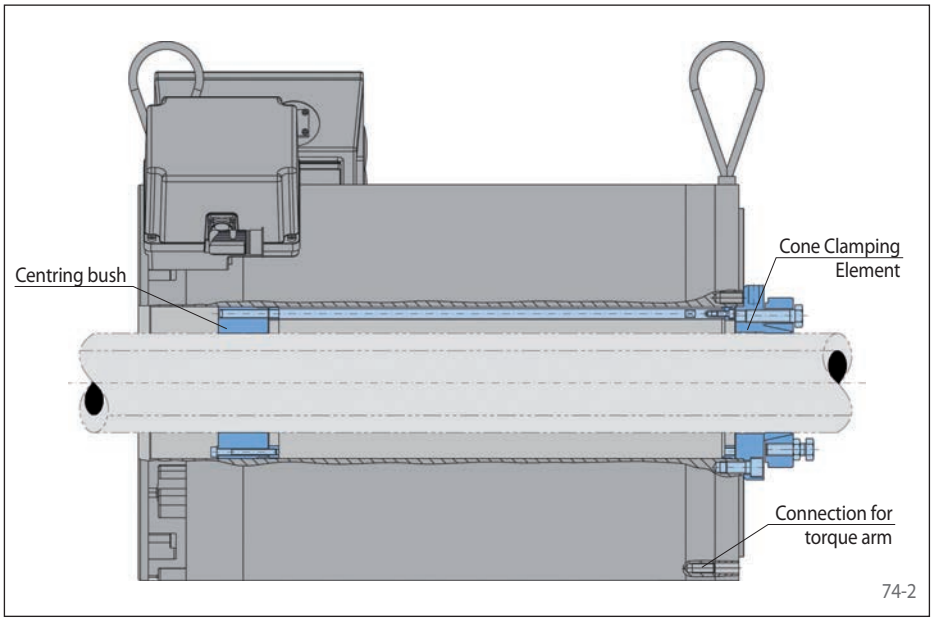
RINGSPANN®

for SIEMENS complete torque motors 1FW3
for mounting and centring complete torque motors on shafts or hollow shafts



Features

- Provides a mechanical connection, support and centring between rotor and machine shaft
- Backlash free, torsion-proof transmission of torque generated by the torque motor
- High true running accuracy
- Optimally configured contact pressure prevents undesirable deformation of hollow machine shafts
- Taper Collet chemically nickel-coated to prevent fretting corrosion
- Easily removable Cone Clamping Element, even after long periods of operation
- Centring bush can be mounted from the B-side of the torque motor



Configuration

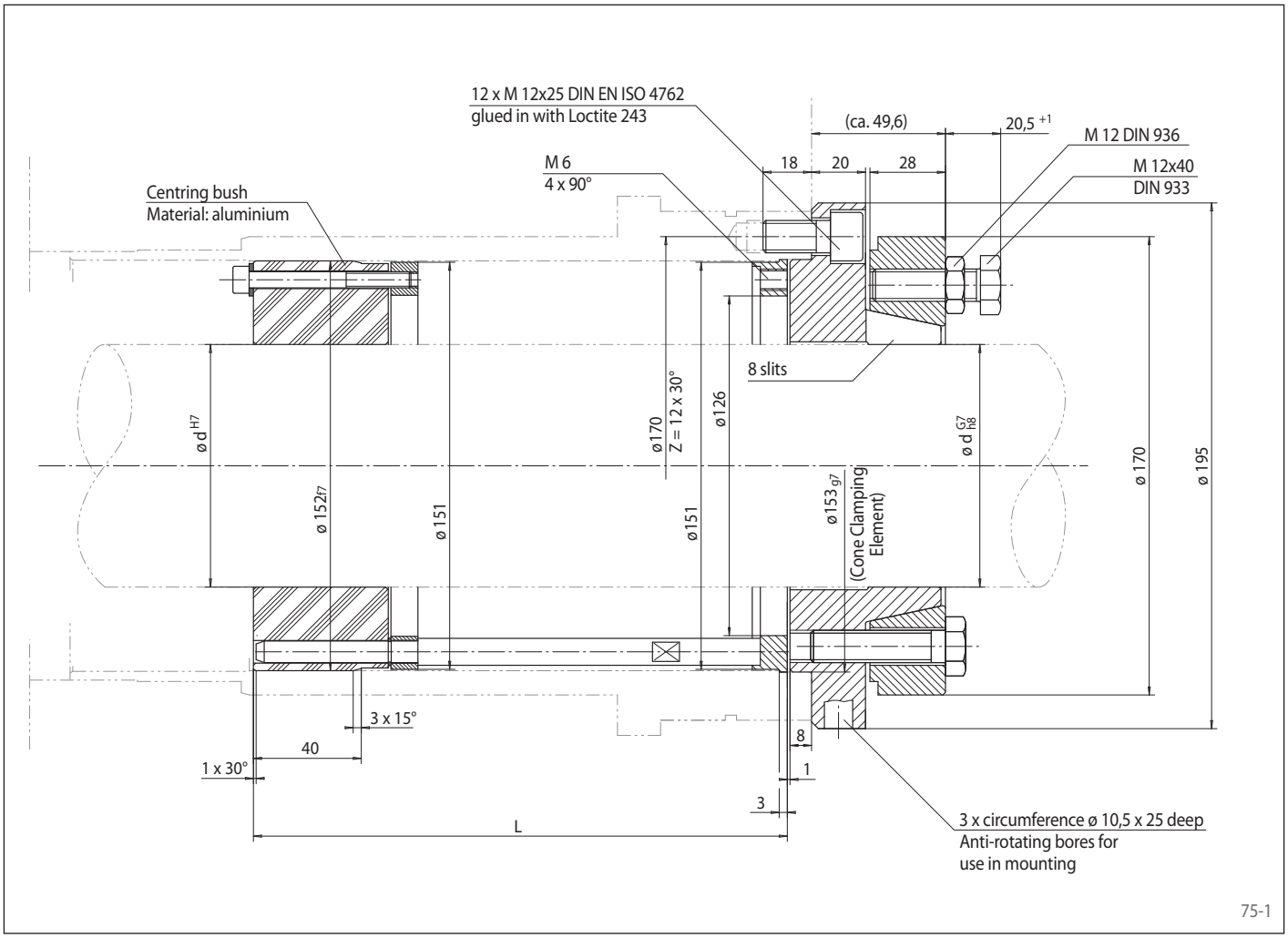
The Clamping System RTM 607 consists of a Cone Clamping Element and a centring bush. The Cone Clamping Element ensures that motor torque is transmitted reliably to the machine shaft and centres the torque motor on the drive side. A second centring unit consisting of an aluminium centring bush ensures good overall alignment of the torque motor with the machine shaft.

The centring bush is secured in its axial position with the aid of rods and a stop ring.

Clamping Systems RTM 607

RINGSPANN®

for SIEMENS complete torque motors 1FW3
for mounting and centring complete torque motors on shafts or hollow shafts



Dimensions

Size	for SIEMENS complete torque motors										
	1FW3150	1FW3152	1FW3154	1FW3155	1FW3156	1FW3201	1FW3202	1FW3203	1FW3204	1FW3206	1FW3208
d mm	L mm	L mm	L mm	L mm	L mm	L mm	L mm	L mm	L mm	L mm	L mm
60 75 80 90 100 110 125	173	230	279	331	384	152	198	244	313	406	521

Example for ordering

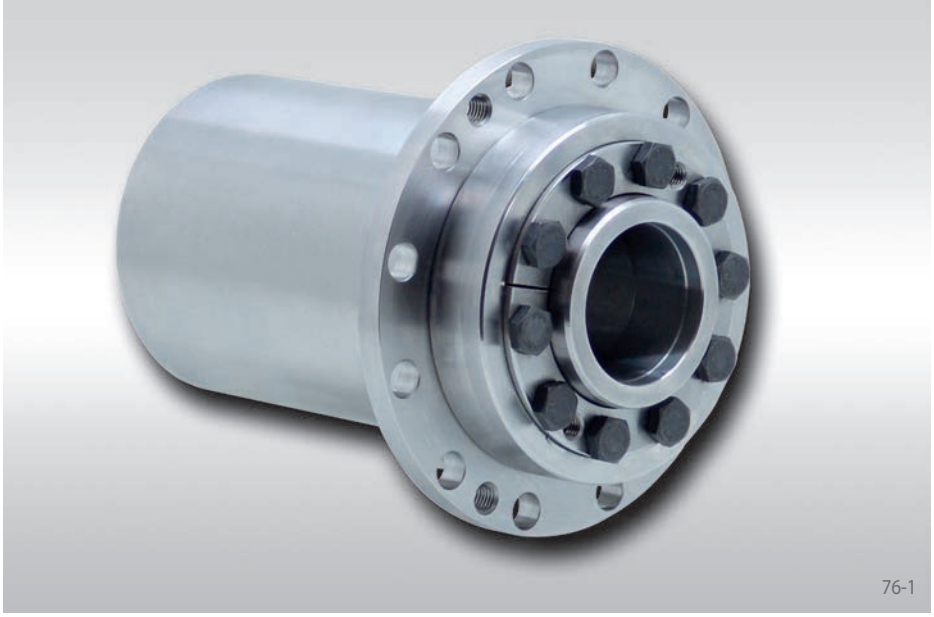
Clamping System RTM 607 for SIEMENS complete torque motors 1FW3 204 for shaft 90 mm:

• RTM 607-090, L = 313 mm

Clamping Systems RTM 608.1 and RTM 608.2

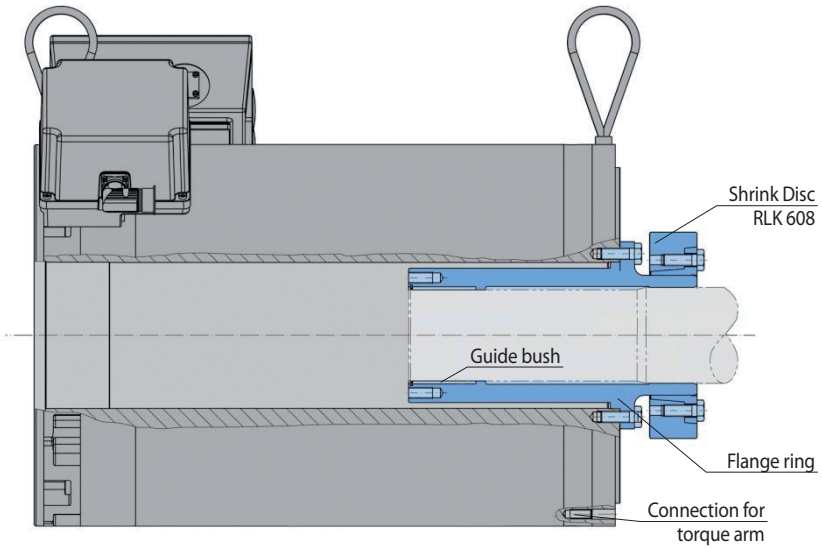
RINGSPANN®

for complete torque motors
for mounting and centring complete torque motors on shafts or hollow shafts

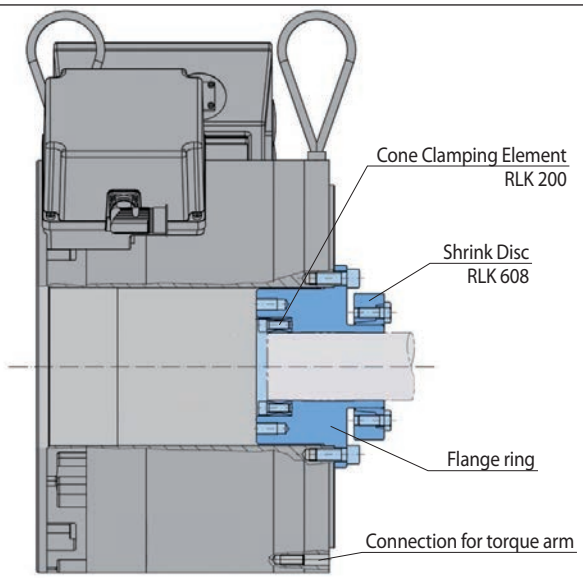


Features

- Provides a mechanical connection, support and centring between rotor and machine shaft
- Backlash free, torsion-proof transmission of torque generated by the torque motor
- High true running accuracy
- For inexpensive clamping on solid shafts
- Easily removable Cone Clamping Element, even after long periods of operation



Clamping System RTM 608.1 configured for long shaft ends 76-2



Clamping System RTM 608.2 configure for short shaft ends 76-3

Configuration

The Clamping System RTM 608 consists of a flange ring and a Shrink Disc RLK 608. The flange ring connects the torque motor to the machine shaft.

In contrast to the Clamping System RTM 607, the torque motor is centred on the Clamping System in a "flying" configuration. The Clamping System RTM 608 can be compared to a flange shaft, but offers the added advantage that a cylindrical shaft end remains following removal of the Clamping System RTM 608, facilitating trouble-free replacement of machine gaskets and bearings.

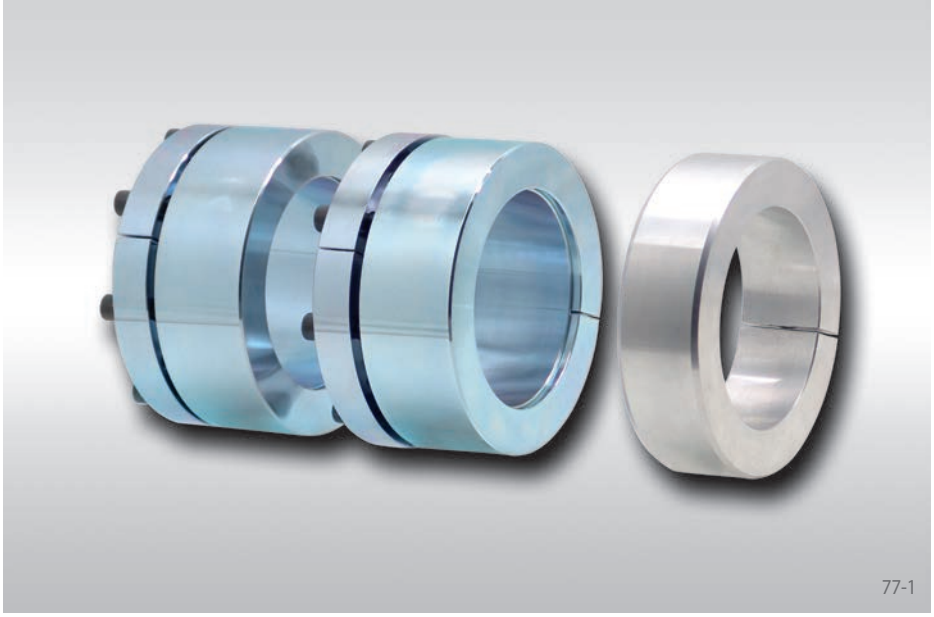
The Clamping System RTM 608 performs two functions in the area in contact with the machine shaft. Torque transmission is effected with the aid of a two-part Shrink Disc RLK 608. The second support point is configured with a glide bush, which helps prevent fretting corrosion resulting from microslippage (Fig. 76-2). In the case of short shaft ends, a Cone Clamping Element RLK 200 is used instead of the glide bush as a second support point in order to ensure the required true run accuracy of the torque motor in relation to the machine shaft (Fig. 76-3).

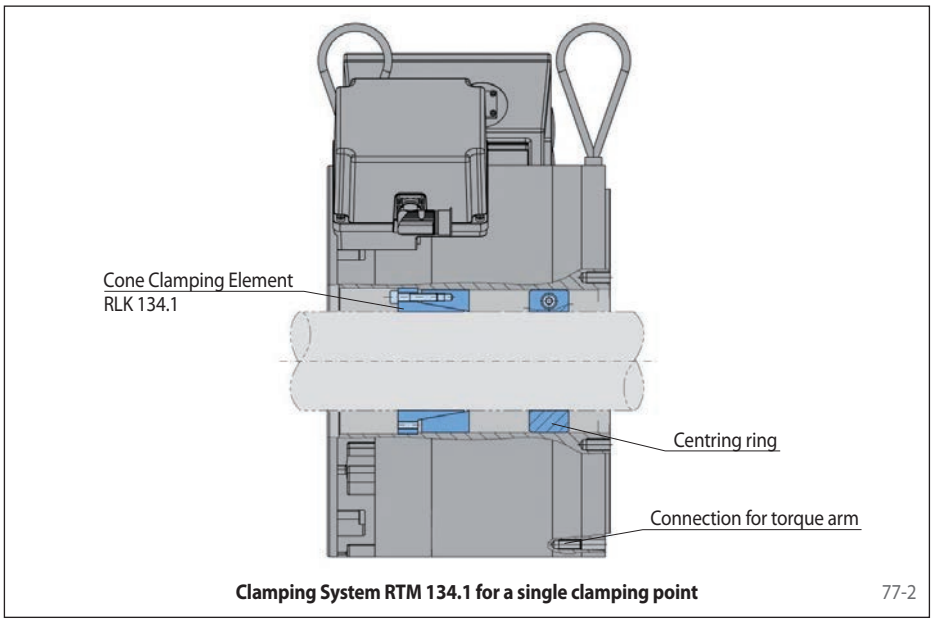
If you have an application for which the Clamping System RTM 608 is suited, please submit your enquiry, including the designation of the torque motor to be used as well as the shaft dimensions.

Clamping Systems RTM 134.1 and RTM 134.2

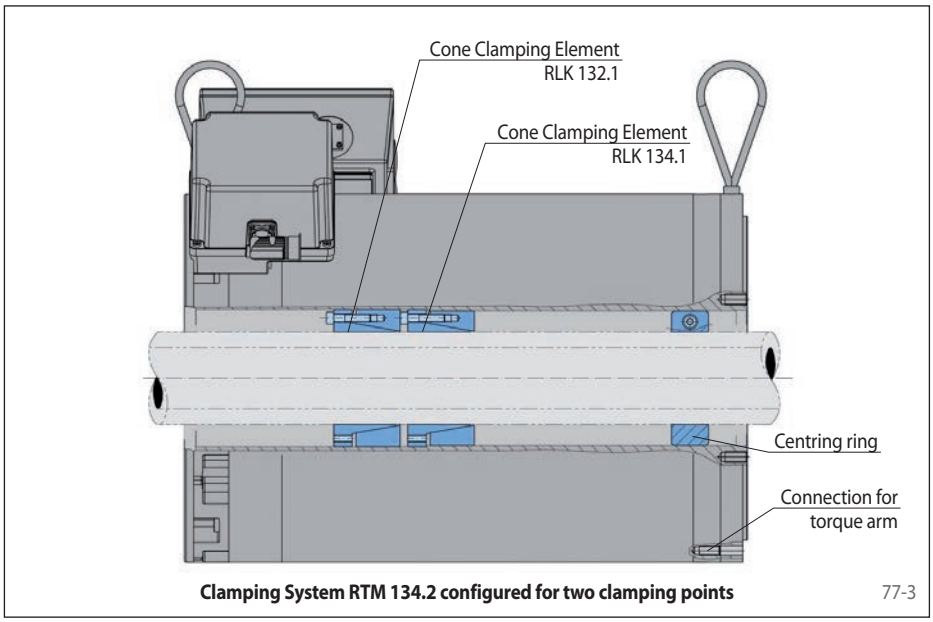
RINGSPANN®

for complete torque motors
for mounting and centring complete torque motors on shafts or hollow shafts





Clamping System RTM 134.1 for a single clamping point 77-2



Clamping System RTM 134.2 configured for two clamping points 77-3

Features

- Provides a mechanical connection and centring between rotor and machine shaft. Support is provided by additional centring ring
- Backlash free, torsion-proof transmission of torque generated by the torque motor
- High true running accuracy
- Optimally configured contact pressure prevents undesirable deformation of the hollow rotor shaft of the torque motor and the hollow machine shaft
- Taper Collet galvanized and blue-chromed to prevent fretting corrosion
- Easily removable Cone Clamping Elements, even after long periods of operation
- Cone Clamping Elements can be mounted from the B-side of the torque motor

Configuration

Depending on the amount of torque to be transmitted between the machine shaft or hollow shaft and the torque motor, either one or two Cone Clamping Elements are used for torque transmission and a centring ring as a second support point are used. The Cone Clamping Elements have been developed in keeping the specific requirements of torque motors. The taper angle is designed in such a way that the Cone Clamping Elements can be removed easily, even after extended periods of operation, and no undesirable contact pressures cause indentations on the torque motor rotor shaft, which is ordinarily a thin-walled element.

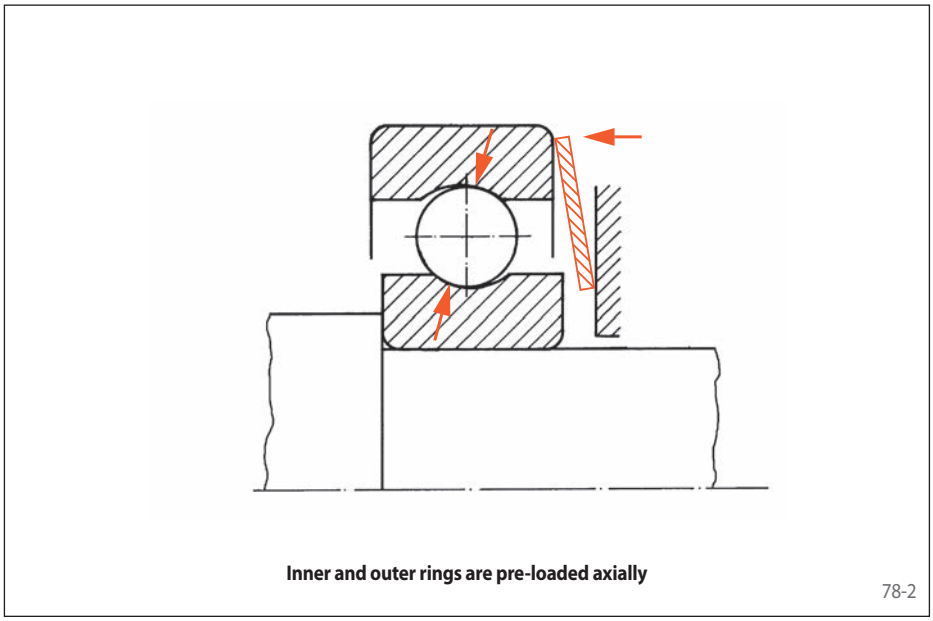
The torque motor manufacturer should be consulted prior to installing this Clamping System. Therefore, we request submission of your enquiry in the event that a Clamping System this kind is considered suitable for your application.

Star Spring Washers

RINGSPANN®

as ball bearing compensating discs for taking up free movement in bearings

78-1



Inner and outer rings are pre-loaded axially

78-2

Conditions for most favourable effect

The effect of axial pre-loading depends on certain conditions:

- The axial pressure must be applied to the whole outer race.
- Axial variations and length tolerances within the components of the machine should have only the very slightest effect on the applied spring force.
- The axial pre-loading must be done with a load suitably adapted to the size of the bearing.

Protection of Bearings subject to vibration when non-rotating

The spring axial location also eliminates damage as a result of vibration in non-rotating bearings. This type of da mage is well known in electric motors for auxiliary drives in ships and vehicles. If the auxiliary drives is stationary, the rotor can vibrate in the bearing, due to the vibration of the ship or vehicle. In these conditions the balls beat in the races of the bearing rings and cause wear. This is why leading manufacturers use only ball bearings, the radial play of which is removed by Star Spring Washers, so preventing any vibration of the rotor. The reason for damage is then completely eliminated.

Features

- RINGSPANN Star Spring Washers are particularly light spring elements with linear or not-linear spring characteristic. They are suitable for application as pressure elements in precision machines and as pressure springs for taking up free movement, and for reducing noise in ball bearings.
- The very large axial movement of the spring guarantees that considerable axial variations and length tolerances can be accommodated without much deviation from the nominal value of the axial force of the Star Spring Washer.
- Because of the large axial variations of the spring it is often possible to achieve the desired effect with a single Star Spring Washer.
- Their spring load corresponds with the optimum values of the relevant bearing sizes.

Service Life

Ball bearings give longer service if the inner and outer rings are pre-loaded axially (figure 78-2). This fact has been known for a long time. This axial preloading by RINGSPANN Star Spring Washers eliminates radial play in the ball bearings. This effects a better distribution of the radial load to be transmitted onto the bearing rings and therefore increases the length of service life of the bearing.

Silent Running

High speed machines, particularly small electric motors, create special problems for the designer regarding silent running. Extensive trials in this field have shown, that in the main, noise originates in the ball bearings, and that the application of the exact amount of axial pressure suitable for each job reducing noise effectively.

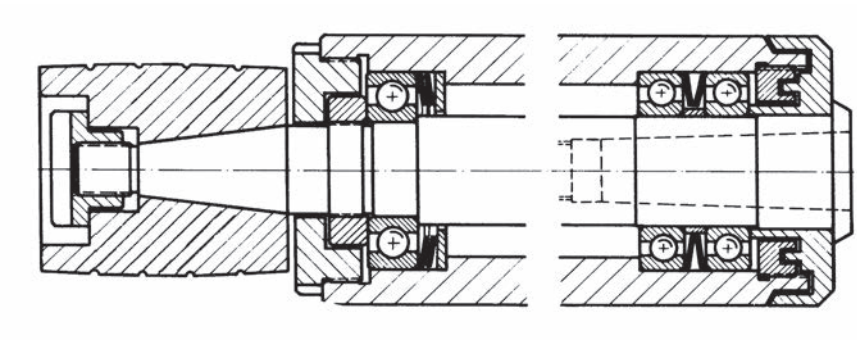
as ball bearing compensating discs for taking up free movement in bearings

Bearing of an internal grinding spindle

Spindle ball bearings are used as bearing support for grinding spindles. Bearings of this kind exhibit maximum tracking accuracy at high rotation speeds.

The specific properties of these bearings can be fully exploited only if the bearings are pre-clamped with a precisely defined force.

RINGSPANN Star Springs Washers enable you to realise the required pre-clamping force of the spindle bearings with a high degree of precision.

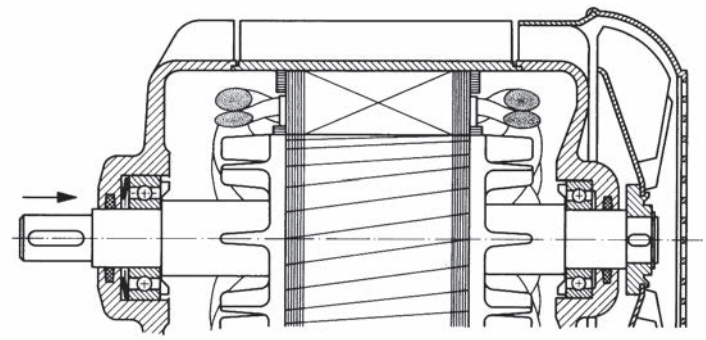


Bearing of an internal grinding spindle

79-1

Pressure spring for ball bearing

Silent running is a particular requirement for electric motors. For this purpose a RINGSPANN Star Spring Washer acts to pre-load the outer race of the bearing as illustrated.

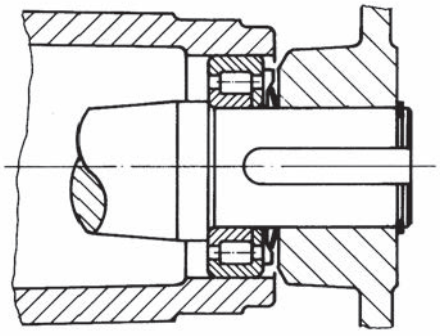


Pressure spring for ball bearing

79-2

Accommodating length tolerances

As shown in this example the RINGSPANN Star Spring Washer fitted between output shaft and NILOS sealing ring makes it possible to accommodate wide axial tolerances.



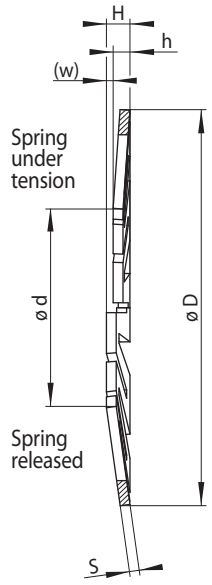
Accommodating length tolerances

79-3

Star Spring Washers

RINGSPANN®

as ball bearing compensating discs for taking up free movement in bearings



With washers stacked in parallel, the pressure forces are added.

Washers with dish angles opposite, the spring travels are added.

80-1

For ball bearing						Dimension			Height		Tolerance for h	Spring travel	Pressure	Spring const.	Article number
						D mm	d mm	s mm	released H mm	under pressure h mm	mm	(w) mm	F N	c N/mm	1051-
				624		12,7	5,3	0,3	1,1	0,7	± 0,15	0,4	14	35	012001
634	E 3	E 4	E 5	625		15,7	7,5	0,3	1,1	0,7	± 0,15	0,4	9	23	015001
635			626	607		18,7	7,5	0,3	1,4	0,7	± 0,15	0,7	10	14	018001
635			626	607		18,7	9,2	0,3	1,2	0,7	± 0,15	0,5	11	22	018002
	E 6					20,7	10,5	0,3	1,3	0,7	± 0,15	0,6	7	12	020001
627	E 7			608		21,7	11	0,5	1,6	0,9	± 0,15	0,7	34	49	021001
	E 8			609		23,7	11	0,5	1,8	1,0	± 0,2	0,8	33	41	023001
629			6000			25,7	11	0,5	2,0	1,0	± 0,2	1,0	31	31	025001
629			6000			25,7	13,5	0,5	1,7	1,0	± 0,2	0,7	30	43	025002
16100	E 9	E 10	6001			27,7	15	0,65	1,9	1,1	± 0,2	0,8	52	65	027001
16101	E 13			6200		29,7	15	0,66	2,1	1,1	± 0,21	1,0	38	38	029001
	E 11	E 12		6201		31,7	15	0,65	2,3	1,1	± 0,2	1,2	46	38	031001
16002			6002	6201		31,7	18	0,65	2,0	1,1	± 0,21	0,9	36	40	031002
16003	E 14	E 15	6003	6202	6300	34,7	20	0,9	2,4	1,4	± 0,2	1,0	89	89	034001
					6301	36,7	20	0,9	2,6	1,4	± 0,21	1,2	92	77	036001
	E 16					37,7	20	0,9	2,7	1,4	± 0,2	1,3	84	65	037001
	E 19	L 17a	Bo 15	6203		39,7	20	0,9	2,9	1,4	± 0,2	1,5	81	54	039001
	E 19			6203		39,7	23	0,9	2,6	1,4	± 0,2	1,2	103	86	039002
16004			6004		6302	41,7	27	0,9	2,4	1,4	± 0,2	1,0	76	76	041001
		EA 17	Bo 17			43,5	27	0,9	2,6	1,4	± 0,2	1,2	68	57	043001
16005	E 20	L 20	6005	6204	6303	46,5	27	0,9	2,9	1,4	± 0,2	1,5	74	49	046001
16005			6005			46,5	30	0,9	2,6	1,4	± 0,2	1,2	72	60	046002
	M 20	L 25	6205	6304		51,5	35	0,9	2,6	1,4	± 0,2	1,2	61	51	051001
16006		6006				54,5	35	1,15	3,1	1,7	± 0,25	1,4	98	70	054001
16007	L 30	6007	6206	6305	6403	61	40	1,15	3,3	1,7	± 0,25	1,6	110	69	061001
16008		6008				67	45	1,15	3,4	1,7	± 0,25	1,7	90	53	067001
			6207	6306	6404	71	45	1,15	3,8	1,7	± 0,25	2,1	110	52	071001
16009		6009				74	50	1,15	3,6	1,7	± 0,25	1,9	130	68	074001

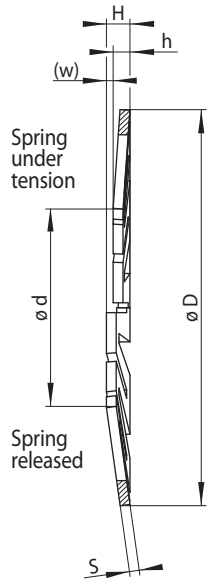
Mounting

Generally it will be found most suitable for the Star Spring Washer to work on the outer ring of the ball bearing. The Star Spring Washer outside diameters given in the following table correspond therefore with the ball bearing outside diameters. The RINGSPANN design with slots and dished shape quarantees even axial pressure on the whole outer race. If an axial pressure is applied to the shaft in one direction only, the Star Spring Washer must be mounted in such a way that there is no axial pressure on it (figure 79-2). If the axial pressures vary or are in both directions, a Star Spring Washer has to be mounted both sides of the ball bearings. In this case and in any doubtful cases we will be pleased to submit an installation proposal.

Star Spring Washers

RINGSPANN®

as ball bearing compensating discs for taking up free movement in bearings



With washers stacked in parallel, the pressure forces are added.

Washers with dish angles opposite, the spring travels are added.

81-1

For ball bearing					Dimension			Height		Tolerance for h	Spring travel	Pressure	Spring const.	Article number
					D mm	d mm	s mm	released H mm	under pressure h mm	mm	(w) mm	F N	c N/mm	1052-
16010	6010	6208	6307	6405	79	58	1,15	3,3	1,7	± 0,25	1,6	290	Diminishing spring characteristic	079001
		6209			84	63	1,15	3,3	1,7	± 0,25	1,6	320		084001
16011	6011	6210	6308	6406	89	63	1,15	3,8	1,7	± 0,25	2,1	290		089001
16012	6012				94	68	1,15	3,8	1,9	± 0,4	1,9	260		094001
16013	6013	6211	6309	6407	99	73	1,15	3,8	1,9	± 0,4	1,9	280		099001
16014	6014	6212	6310	6408	109	78	1,15	4,2	2,0	± 0,4	2,2	180		109001
16015	6015				114	83	1,15	4,2	2,0	± 0,4	2,2	200		114001
		6213	6311	6409	119	88	1,15	4,2	2,0	± 0,4	2,2	270		119001
16016	6016	6214			124	93	1,15	4,2	2,0	± 0,4	2,2	250		124001
16017	6017	6215	6312	6410	129	98	1,15	4,2	2,0	± 0,4	2,2	250		129001
16018	6018	6216	6313	6411	139	98	1,25	5,3	2,3	± 0,5	3,0	330		139001
16019	6019				144	103	1,25	5,3	2,3	± 0,5	3,0	330		144001
16020	6020	6217	6314	6412	149	108	1,25	5,3	2,3	± 0,5	3,0	370		149001
16021	6021	6218	6315	6413	158	118	1,5	5,5	2,5	± 0,5	3,0	410		158001
16022	6022	6219	6316		168	123	1,5	6	2,7	± 0,5	3,3	470		168001
16024	6024	6220	6317	6414	178	133	1,5	6	2,7	± 0,5	3,3	600		178001
		6221	6318	6415	188	138	2,1	7	3,3	± 0,5	3,7	520		188001
16026	6026	6222	6319	6416	198	143	2	7,5	3,3	± 0,5	4,2	660		198001
16028	6028			6417	208	163	2	6,2	3,0	± 0,5	3,2	1160		208001
		6224	6320		213	168	2	6,4	3,1	± 0,5	3,3	1120		213001
16030	6030		6321	6418	223	183	2	6,1	3,0	± 0,5	3,1	1200		223001
		6226			228	188	2	6,2	3,0	± 0,5	3,2	1160		228001
16032	6032		6322		238	198	2	6,4	3,1	± 0,5	3,3	1120		238001
		6228			248	211	2	6,2	3,0	± 0,5	3,2	1160		248001
16034	6034		6324		258	223	2	6,2	3,0	± 0,5	3,2	1180		258001

Explanation concerning the table

Apart from the listed ball bearing series the Star Spring Washers can also be used for series 32, 33, 42, 72 and 73. Pressure F is attained at height h. The spring constant c, i.e. the pressure increase per mm spring travel can only be given up to size 74 x 50 x 1,15.

With larger Star Spring Washers the spring characteristic is not linear but diminishing. With tolerances of the installation height h the pressure F therefore changes even less than with smaller washers. Up to size 129 x 98 x 1,15 the springs can be supplied plated against corrosion.

Example for ordering

Star Spring Washer for ball bearings of series 16011:

- Article number 1052-089001

Europe

Germany

RINGSPANN GmbH
Schaberweg 30 - 38
61348 Bad Homburg
Germany
+49 61 72 275 0
info@ringspann.de
www.ringspann.com

RINGSPANN RCS GmbH
Hans-Mess-Straße 7
61440 Oberursel
Germany
+49 61 72 67 68 50
info@ringspann-rcs.de
www.ringspann-rcs.com

France

SIAM - RINGSPANN S.A.
23 rue Saint-Simon
69009 Lyon
France
+33 4 78 83 59 01
info@siam-ringspann.fr
www.ringspann.fr

Netherlands, Belgium, Luxembourg

RINGSPANN Benelux B.V.
Nieuwenkampsmaten 6-15
7472 De Goor
Netherlands
+31 547 26 13 55
info@ringspann.nl
www.ringspann.nl

Great Britain, Ireland

RINGSPANN (U.K.) LTD.
3, Napier Road
Bedford MK41 0QS
Great Britain
+44 12 34 34 25 11
info@ringspann.co.uk
www.ringspann.co.uk

Austria, Hungary, Slovenia

Edmayr Antriebstechnik GmbH
Thalham 20
4880 St. Georgen
Austria
+43 76 67 68 40
office@edmayr.at
www.ringspann.com

Italy

RINGSPANN Italia S.r.l.
V.le A. De Gasperi, 31
20020 Lainate (MI)
Italy
+39 02 93 57 12 97
info@ringspann.it
www.ringspann.it

Poland

RADIUS-RADPOL sp.j.
Wiecheć, Labacki
ul. Kolejowa 16b
60 185 Skórzewo
Poland
+48 61 814 39 28
info@radius-radpol.com.pl
www.radiusradpol.pl

Sweden, Finland, Denmark, Norway, Baltic states

RINGSPANN Nordic AB
Industrigatan 7
61933 Trosa
Sweden
+46 156 190 98
info@ringspann.se
www.ringspann.se

Switzerland

RINGSPANN AG
Sumpfstrasse 7
6300 Zug
Switzerland
+41 41 748 09 00
info@ringspann.ch
www.ringspann.ch

Spain, Portugal

RINGSPANN IBERICA S.A.
C/Uzbina, 24-Nave E1
01015 Vitoria
Spain
+34 945 22 77-50
info@ringspann.es
www.ringspann.es

Czech Republic, Slovakia

Ing. Petr Schejbal
Mezivrší 1444/27
147 00 Praha
Czech Republic
+420 222 96 90 22
Petr.Schejbal@ringspann.cz
www.ringspann.com

Asia

Australia, New Zealand

Kempower Pty. Ltd.
6 Phoenix Court, Braeside
3195 Victoria
Australia
+61 3 95 87 90 33
dirk@imtec-kempower.com.au
www.imtec-kempower.com.au

China, Taiwan

RINGSPANN Power Transmission (Tianjin) Co., Ltd.
No. 21 Gaoyan Rd.
Binhai Science and Technology Park
Binhai Hi-Tech Industrial
Development Area
Tianjin, 300458
P.R. China
+86 22 59 80 31 60
info.cn@ringspann.cn
www.ringspann.cn

India, Bangladesh, Nepal

RINGSPANN Power Transmission India Pvt. Ltd.
GAT No: 679/2/1
Village Kuruli, Taluka Khed
Chakan-Alandi Road
Pune - 410501
India
+91 21 35 67 75 00
info@ringspann-india.com
www.ringspann-india.com

Singapore, ASEAN

RINGSPANN Office
Arthur Low
1 Scotts Road
#21-10 Shaw Centre
Singapore 228208
+65 96 33 66 92
Arthur.Low@ringspann.com
www.ringspann.com

America

Brazil

Antares Acoplamentos Ltda.
Rua Evaristo de Antoni, 1222
Caxias do Sul, RS
CEP 95041-000
Brazil
+55 54 32 18 68 00
cristiano@antaresacoplamentos.com.br
www.antaresacoplamentos.com.br

USA, Canada, Mexico, Chile, Peru

RINGSPANN Corporation
10550 Anderson Place
Franklin Park, IL 60131
U.S.A
+1 847 678 35 81
info@ringspanncorp.com
www.ringspanncorp.com

Africa and Middle East

Egypt

Shofree Trading Co.
218 –emtedad Ramsis (2)
2775 Nasr City Cairo
Egypt
+20 2 20 81 20 57
info@shofree.com
www.ringspann.com

Israel

G.G. Yarom Rolling and Conveying Ltd.
6, Hamaktesh Str.
58810 Holon
Israel
+972 3 557 01 15
noam_a@gg.co.il
www.ringspann.com

Algeria, Morocco, Tunisia

SIAM - RINGSPANN S.A.
23 rue Saint-Simon
69009 Lyon
France
+33 4 78 83 59 01
info@siam-ringspann.fr
www.ringspann.fr

South Africa, Sub-Saharan

RINGSPANN Transmission Components (Pty) Ltd.
96 Plane Road Spartan
Kempton Park
P.O. Box 8111 Edenglen 1613
South Africa
+27 11 394 18 30
info@ringspann.co.za
www.ringspann.co.za

Iran

Rastan Felez Taha Eng Trading Co (RFT)
Unit No. 8
461, North Kargar Avenue
Tehran postal code 1413683164
Iran
+98 21 88 00 94 35
info@rftrft.com
www.ringspann.com